

PUBLICATIONS

MATHEMATIQUES

D'ORSAY

80.06

TABLES MINORANT LA RACINE n -IÈME DU DISCRIMINANT^{NT}

D'UN CORPS DE DEGRÉ n

Francisco DIAZ Y DIAZ

Université de Paris-Sud
Département de Mathématique

Bât. 425

01105 ORSAY France

Code matière AMS : 12-04 , 12 A 50

Mots-clefs : Minoration, discriminant, corps, degré, conjugués réels, conjugués imaginaires, corps totalement réels, corps totalement imaginaires, contributions locales

PUBLICATIONS

MATHEMATIQUES

D'ORSAY

80.06

TABLES MINORANT LA RACINE n -IÈME DU DISCRIMINANT

D'UN CORPS DE DEGRÉ n

Francisco DIAZ Y DIAZ

**Université de Paris-Sud
Département de Mathématique**

Bât. 425

91405 ORSAY France

1. DESCRIPTION DES TABLES

Les tables qui suivent ont été calculées sur l'UNIVAC 1110 du Centre de Calcul de l'Université de Paris-Sud, selon la méthode d'ODLIZKO-SERRE avec l'amélioration de G. POITOU (Sur les petits discriminants. Séminaire DELANGE-PISOT-POITOU (Théorie des Nombres) 18^e année 1976/77 n°6).

Dans ce texte (cité [P] dans la suite), la formule (26) minore $\frac{1}{n} \log |d|$ par une certaine fonction de la variable y ; nos tables ont été construites en utilisant, dans chaque cas, la valeur optimum de y (1).

La table 1 donne des minorations pour $|d|^{1/n}$ dans le cas totalement imaginaire pour toutes les valeurs (entières) du degré n dans l'intervalle

$$2 \ll n \ll 4000 .$$

La table 2 est l'analogue de la table 1 dans le cas totalement réel. Elle a été établie pour les valeurs de n dans l'intervalle

$$1 \ll n \ll 2000 .$$

La table 3 concerne tous les corps de degrés jusqu'à 10 . Dans la construction de cette table on a pris en considération une partie de l'effet numérique dû aux contributions locales ([P], page 16) ; des explications détaillées sur les corrections utilisées seront données au paragraphe 4.

(1) Rappelons que la formule (26) de [P] (et, par conséquent, aussi nos tables) est valable inconditionnellement (c'est-à-dire sans supposer vérifiée l'hypothèse de Riemann).

Dans la table 4 on donne des minoration pour $|d|^{1/n}$ (sans corrections locales) pour tous les corps de degrés jusqu'à 100 .

Les résultats sont donnés avec 8 décimales et sont exacts dans le sens suivant : la minoration de $|d|^{1/n}$ fournie par la méthode est supérieure à la valeur donnée ici.

2. COMPLÉMENTS AUX TABLES

Nous indiquerons ici divers moyens de prolonger les tables aux degrés plus grands.

2.1. La formule (16) de [P] s'écrit, en général,

$$(1) \quad \frac{1}{n} \log |d| \gg \gamma + \log 4\pi + \frac{r_1}{n} - \frac{3}{5}(12\pi)^{2/3} b_3^{1/3} n^{-2/3},$$

avec $b_3 = \lambda(3) + \frac{r_1}{n} \eta(2)$. Les valeurs numériques à considérer sont (1) :

$$\gamma + \log 4\pi = 3,10823 \ 99118 \ 70\dots$$

$$\lambda(3) = 1,05179 \ 97902 \ 64\dots$$

$$\eta(2) = 0,82246 \ 70334 \ 24\dots$$

$$\frac{3}{5}(12\pi)^{2/3} = 6,74588 \ 07993 \ 64\dots .$$

Nous démontrerons dans la proposition 1 que si l'on minore $\frac{1}{n} \log |d|$ au moyen de la formule (1), au lieu de le faire en suivant la méthode des tables, on a une perte de précision inférieure à $7,66n^{-4/3}$.

(1) Les valeurs numériques ont été prises dans : "Handbook of Mathematical Functions with Formulas, Graphs and Mathematical Tables". Edited by M. Abramowitz and I.A. Stegun, Dover Publications Inc. N.Y.

2.2. Une formule modifiée due à G. POITOU s'écrit :

$$(2) \quad \frac{1}{n} \log |d| \gg \gamma + \log 4\pi + \frac{r_1}{n} - \frac{3}{5}(12\pi)^{2/3} b_3^{1/3} / (n^{2/3} + \frac{1}{4}(12\pi/b_3)^{2/3} c_2),$$

avec $c_2 = 12b_5/35b_3$ et $b_5 = \lambda(5) + \frac{r_1}{n}\eta(4)$.

Les valeurs numériques à utiliser sont

$$\begin{aligned} \lambda(5) &= 1,00452 \ 37627 \ 95\dots \\ \eta(4) &= 0,94703 \ 28294 \ 97\dots \\ \frac{1}{4}(12\pi)^{2/3} &= 2,81078 \ 36664 \ 01\dots \end{aligned}$$

Nous démontrerons dans la proposition 2 que la formule (2) donne réellement une minoration pour $\frac{1}{n} \log |d|$ et que la perte de précision qui résulte d'utiliser la formule (2), au lieu de suivre la méthode des tables, est inférieure à $11,5.n^{-2}$.

2.3. Rappelons la formule (26) de [P] :

$$(3) \quad \frac{1}{n} \log |d| \gg \gamma + \log 4\pi + \frac{r_1}{n} - \frac{12\pi}{5n} y^{-1/2} - L_1(y).$$

Comme cette formule est valable pour tout y positif, on peut l'appliquer avec le choix particulier suggéré par G. POITOU :

$$(4) \quad y_1 = \frac{1}{4}t(1+c_3t^2)\exp(c_2t),$$

avec $t = (12\pi/nb_3)^{2/3}$, $c_3 = \frac{7}{4}c_2^2 - 4b_7/21b_3$, $b_7 = \lambda(7) + \frac{r_1}{n}\eta(6)$ et les valeurs numériques :

$$\begin{aligned} \lambda(7) &= 1,00047 \ 15486 \ 52\dots \\ \eta(6) &= 0,98555 \ 10912 \ 97\dots \\ (12\pi)^{3/2} &= 11,24313 \ 46656 \ 07\dots \end{aligned}$$

On démontrera dans la proposition 3 que si l'on remplace dans la formule (3) la valeur y_1 donnée par (4) au lieu de la valeur optimum de y , il résulte une perte de précision dans la minoration de $\frac{1}{n} \log |d|$ inférieure à $24580n^{-4}$.

2.4. Ecrivons la perte de précision établie dans les propositions 1, 2 et 3 sous la même forme que dans les énoncés de ces propositions, c'est-à-dire, sous la forme Cn^{-k} avec, respectivement, $k=4/3$, 2 et 4. Il est intéressant de comparer la valeur de C qui est démontrée à celle obtenue expérimentalement à partir de la différence entre la minoration donnée par la méthode des tables et celle donnée par l'utilisation des formules (1), (2) ou (3) avec la valeur y_1 de (4) à la place de la variable.

Les tableaux 1, 2 et 3 donnent, dans le cas totalement imaginaire et pour des valeurs différentes de n , la valeur de la constante C observée expérimentalement. Si l'on note δ la valeur de la colonne nommée "différence" (et qui correspond à la différence entre les deux colonnes précédentes) on calcule la valeur de C au moyen de la formule

$$C = \delta n^k,$$

avec $k=4/3$ pour le tableau 1, $k=2$ pour le tableau 2 et $k=4$ pour le tableau 3.

A l'évidence, les conditions de validité des formules (1) et (2) semblent remplies, expérimentalement, dès que l'on prend $n \gg 10$; rappelons que ces formules ne sont démontrées dans les propositions 1 et 2 que pour $n \gg 458$ et $n \gg 768$ respectivement.

On remarque aussi, en examinant ces tableaux, qu'on a la même précision que dans les tables pour $n \gg 10^8$ environ quand on utilise la formule (1), pour $n \gg 10^5$ environ si l'on utilise la formule (2) et, pratiquement, pour $n \gg 100$ si l'on remplace y_1 dans la formule (3).

Ce que nous venons de dire montre que, pour obtenir une minoration de $|d|^{1/n}$ pour $n \gg 100$, il est commode (et correct) de suivre

Tableau 1

n	y optimum	Minoration pour $\frac{1}{n} \log d $ donnée par		différence	C
		les tables	la formule (1)		
10	1,303027	1,8871214115	1,6302106820	$2,5691 \times 10^{-1}$	5,5349739
10^2	0,149064	2,8026912664	2,7898081673	$1,2883 \times 10^{-2}$	5,9798049
10^3	0,028164	3,0402436487	3,0396358721	$6,0778 \times 10^{-4}$	6,0777655
10^4	0,005900	3,0934879296	3,0934596195	$2,8310 \times 10^{-5}$	6,0992188
10^5	0,001264	3,1050569094	3,1050555944	$1,3150 \times 10^{-6}$	6,1038607
10^6	0,000272	3,1075539325	3,1075538714	$6,1049 \times 10^{-8}$	6,1048618
10^7	0,000059	3,1080921117	3,1080921089	$2,8337 \times 10^{-9}$	6,1050774
10^8	0,000013	3,1082080688	3,1082080686	$1,3153 \times 10^{-10}$	6,1051240

Tableau 2

n	y optimum	Minoration pour $\frac{1}{n} \log d $ donnée par		différence	C
		les tables	la formule (2)		
10	1,303027	1,8871214115	1,8679965081	$1,9125 \times 10^{-2}$	1,9124903
10^2	0,149064	2,8026912664	2,8024395352	$2,5173 \times 10^{-4}$	2,5173118
10^3	0,028164	3,0402436487	3,0402410007	$2,6480 \times 10^{-6}$	2,6479715
10^4	0,005900	3,0934879296	3,0934879028	$2,6758 \times 10^{-8}$	2,6757822
10^5	0,001264	3,1050569094	3,1050569091	$2,6818 \times 10^{-10}$	2,6817518
10^6	0,000272	3,1075539325	3,1075539325	$2,6830 \times 10^{-12}$	2,6830374

Tableau 3

n	y optimum	y ₁	Minoration pour $\frac{1}{n} \log d $ donnée par		différence	C
			y optimum	y ₁		
50	0,261431	0,261372	2,634832756683	2,634832752310	$4,3731 \times 10^{-9}$	0,0273317
60	0,224451	0,224413	2,685858899188	2,685858896899	$2,2896 \times 10^{-9}$	0,0296734
70	0,197862	0,197836	2,724943517235	2,724943515943	$1,2921 \times 10^{-9}$	0,0310223
80	0,177726	0,177707	2,756022606570	2,756022605795	$7,7521 \times 10^{-10}$	0,0317525
90	0,161887	0,161873	2,781441120153	2,781441119664	$4,8905 \times 10^{-10}$	0,0320865
100	0,149064	0,149053	2,802691266469	2,802691266148	$3,2162 \times 10^{-10}$	0,0321618
110	0,138443	0,138434	2,820772055627	2,820772055408	$2,1901 \times 10^{-10}$	0,0320654
120	0,129482	0,129475	2,836379858023	2,836379857869	$1,5362 \times 10^{-10}$	0,0318545
130	0,121807	0,121802	2,850016319786	2,850016319675	$1,1052 \times 10^{-10}$	0,0315670
140	0,115150	0,115145	2,862052830316	2,862052830235	$8,1292 \times 10^{-11}$	0,0312290
200	0,088243	0,088241	2,912792400550	2,912792400532	$1,8030 \times 10^{-11}$	0,0288480
400	0,053467	0,053467	2,983924630178	2,983924630177	$8,7715 \times 10^{-13}$	0,0224551
800	0,032870	0,032870	3,029449771846	3,029449771846	$3,9320 \times 10^{-14}$	0,0161073
1600	0,020391	0,020391	3,058415222824	3,058415222824	$1,6800 \times 10^{-15}$	0,0109992

les indications données dans [P] page 15, à savoir : Construire, à partir de l'expression (24), une inégalité analogue à (25) et calculer la valeur des fonctions $L(y_1)$, $L(y_1/4)$, $L(y_1/9), \dots$, soit au moyen de la formule (23) lorsque l'argument de la fonction est "assez grand" (par exemple pour $y_1/k^2 > 0,1$), soit au moyen de la série (22) pour les petites valeurs de l'argument. On obtient ainsi une approximation de la fonction $L_1(y_1)$ qui, reportée dans (26) donne la minoration de $\frac{1}{n} \log |d|$.

2.5. La constante C dont on donnera la valeur dans les énoncés des propositions 1, 2 et 3, est indépendante du rapport r_1/n . On peut obtenir une valeur plus précise de la constante si le rapport r_1/n est connu : c'est ce que nous avons fait dans les remarques qui suivent les propositions pour les deux cas les plus intéressants : $r_1=0$ et $r_1=n$.

Dans le tableau suivant on présente un résumé des différentes valeurs de C permettant de les comparer entre elles. Les colonnes du tableau étant numérotées, dans la colonne i ($i=1,2,3$) on indique des valeurs de C qui proviennent de la proposition i , de la remarque i ou du tableau i .

Tableau 4

	1	2	3
Valeur indépendante de r_1/n	7,660	11,471	24580
Pour $r_1=0$	6,311	5,900	5055
Pour $r_1=n$	6,995	4,554	1240
Valeur expérimentale pour $r_1=0$	6,106	2,684	0,033

3. JUSTIFICATION DES ASSERTIONS CI-DESSUS

3.1. NOTATIONS

On conserve, en général, les notations de [P]. En outre, on désigne par $f(z)$ la fonction définie pour $0 < z < 1$ par l'expression

$$f(z) = \frac{24\pi}{5n} z^{-\frac{1}{2}} + \frac{b_3}{5} z - \frac{9b_5}{175} z^2 + \frac{2b_7}{105} z^3 - \frac{2b_9}{231} z^4 + \frac{9b_{11}}{2002} z^5 \\ + 36 \cdot \sum_{k=6}^{\infty} \frac{(-1)^{k+1} b_{2k+1}}{(2k+1)(2k+3)(k+2)(k+3)} z^k,$$

où on a écrit

$$b_{2k+1} = \lambda(2k+1) + \frac{r_1}{n} \eta(2k), \quad k = 1, 2, \dots,$$

avec

$$\lambda(k) = 1 + 3^{-k} + 5^{-k} + \dots$$

et

$$\eta(k) = 1 - 2^{-k} + 3^{-k} - 4^{-k} + \dots$$

On remarquera que si l'on fait $z = 4y$ on obtient

$$f(z) = \frac{12\pi}{5n} y^{-\frac{1}{2}} + L_1(y).$$

On désigne encore par t , c_2 et c_3 les expressions définies dans le paragraphe précédent et on note

$$z_1 = t(1+c_3 t^2) \exp(c_2 t);$$

c'est une valeur approchée de la valeur z_0 définie par l'équation

$$f'(z_0) = 0.$$

Si l'on pose

$$z_1 = z_0 + a$$

on obtient

$$(5) \quad f(z_1) - f(z_0) = \frac{1}{2} a^2 f''(z_0 + \theta a), \quad \text{avec } 0 < \theta < 1.$$

3.2. QUELQUES LEMMES

Soit k un entier positif. Nous écrirons $b_{2k+1}(x)$ pour désigner la fonction d'une variable réelle :

$$b_{2k+1}(x) = \lambda(2k+1) + x^{\eta(2k)} ;$$

on écrira, de même, $c_2(x)$ et $c_3(x)$ pour désigner les fonctions obtenues en remplaçant, dans les définitions de c_2 et c_3 , les constantes b_{2k+1} par les fonctions $b_{2k+1}(x)$. Pour $0 \ll x \ll 1$ on a :

LEMME 1. i) Pour tout couple d'entiers tel que $k > k' > 0$ on a :

$$\frac{b_{2k+1}(0)}{b_{2k'+1}(0)} \ll \frac{b_{2k+1}(x)}{b_{2k'+1}(x)} \ll \frac{b_{2k+1}(1)}{b_{2k'+1}(1)} .$$

ii) On a : $c_3(0) \ll c_3(x) \ll c_3(1)$.

DÉMONSTRATION. Il suffit de dériver les fonctions correspondantes et vérifier que la dérivée est positive pour $0 \ll x \ll 1$.

Le lemme 1 nous permet d'établir les inégalités suivantes qui seront utilisées par la suite :

- (6) $0,95505\ 22561 \ll b_5/b_3 \ll 1,04124\ 73350$
- (7) $0,95119\ 96083 \ll b_7/b_3 \ll 1,05962\ 64177$
- (8) $0,95080\ 00993 \ll b_9/b_3 \ll 1,06510\ 14690$
- (9) $0,95075\ 66699 \ll b_{11}/b_3 \ll 1,06657\ 44858$
- (10) $0,99596\ 60345 \ll b_7/b_5 \ll 1,01766\ 07985$
- (11) $0,32744\ 64878 \ll c_2 \ll 0,35699\ 56577$
- (12) $0,00645\ 62264 \ll c_3 \ll 0,02119\ 67210$
- (13) $7,39604\ 93550n^{-2/3} \ll t \ll 10,87089\ 64581n^{-2/3}$.

Nous écrirons I pour représenter l'intervalle

$$I = (t(1+c_2t), t(1+c_2t+t^2)) ,$$

et nous ne prendrons en considération que le cas où l'on a $I \subset (0,1)$; la fonction $f(z)$ possède les propriétés suivantes :

LEMME 2. i) $z_1 \in I$,

ii) $z_0 \in I$ pour $n \geq 458$,

iii) pour $n \geq 86$ et $z \in I$ on a $f''(z) > 0$,

iv) pour $n \geq 139$ et $z \in I$ on a $f'''(z) < 0$.

DEMONSTRATION. Le premier point découle de la définition de z_1 .
Pour démontrer ii) il suffit de remarquer que l'on a

$$f'(t(1+c_2t)) < 0$$

à condition de prendre $t < 0,183$ et que dans ce cas on a aussi

$$f'(t(1+c_2t+t^2)) > 0;$$

or, l'inégalité (13) montre que pour avoir $t < 0,183$ on doit avoir $n \geq 458$.

Pour démontrer iii) et iv) on minore $f''(t(1+c_2t+t^2))$ par 0, (ce qui est possible pour $t < 0,56$) et on majore $f'''(t(1+c_2t+t^2))$ par 0, (ce qui est possible pour $t < 0,4$).

Nous avons à établir encore un petit lemme dont la démonstration est immédiate :

LEMME 3. i) Pour $0 \ll x \ll 0,7$ on a

$$\frac{1}{3}(2e^{-x/2} + e^x) \ll 1 + x^2/4 + x^3/13,$$

ii) Pour $0 \ll x \ll 0,158$ on a

$$e^x \ll 1 + 13x/12.$$

iii) Pour $0 \ll x \ll 0,5$ on a

$$e^x \ll 1 + x + x^2/2 + x^3/3.$$

3.3. JUSTIFICATION DES ASSERTIONS

PROPOSITION 1. Pour $n \geq 458$ on a la majoration

$$0 \ll \frac{3b_3t}{5} - f(z_0) \ll Cn^{-4/3}$$

avec $C = 7,66$.

DÉMONSTRATION. On écrit

$$3b_3t/5 - f(z_0) = (3b_3t/5 - f(t)) + (f(t) - f(z_0))$$

et on remarque que le premier terme est positif et majoré par

$$9b_5t^2/175 = 3b_3c_2t^2/20 ;$$

le lemme 2 et la formule de Taylor nous permettent d'écrire

$$f(t) - f(z_0) = \frac{1}{2}a^2 f''(z_0 - \theta a) < 3b_3(c_2+t)^2 t^3/20 ,$$

avec $a = z_0 - t$ et $0 < \theta < 1$.

En ajoutant maintenant les deux majorations on obtient

$$\begin{aligned} 3b_3t/5 - f(z_0) &< 0,06156b_3t^2 \\ &< 7,66n^{-4/3} . \end{aligned}$$

REMARQUE 1. Comme nous avons indiqué en 2.5, on peut être plus précis sur la valeur de C à condition de fixer le rapport r_1/n . Pour $r_1 = 0$, on obtient $C = 6,3109$ et pour $r_1 = n$ on a $C = 6,9942$.

Si l'on écrit l'inégalité de l'énoncé de la proposition 1 sous la forme

$$3b_3t/5 - f(z_0) < Cn^{-4/3} + o(n^{-4/3}) ,$$

on trouve comme valeur de la constante

$$C = 6,106$$

dans le cas $r_1 = 0$, valeur qui coïncide avec celle que l'on trouve expérimentalement pour la même valeur de r_1 . Dans le cas totalement réel on a

$$C = 5,4902 .$$

PROPOSITION 2. Pour $n \gg 768$ on a la majoration

$$0 < \frac{3b_3t/5}{1+c_2t/4} - f(z_0) < Cn^{-2} ,$$

avec $C = 11,471$.

DÉMONSTRATION. On écrit, pour simplifier,

$$v = 3b_3t/5, \quad u = c_2t/4, \quad z_2 = te^{c_2t}$$

et on considère l'inégalité :

$$f(z_0) \ll f(z_2) \ll 2b_3te^{-2u}/5 + b_3te^{4u}/5 - 3b_3c_2t^2e^{8u}/20 + 2b_7t^3e^{12u}/105,$$

qui, d'après le lemme 3, peut s'écrire encore sous la forme

$$f(z_0) \ll v(1+4u^2+16u^3/3) - uv(1+8u+32u^2) + 2b_7t^3(1+13u)/105.$$

Les inégalités (6) et (10) montrent que l'on a

$$f(z_0) < \frac{v}{1+u} - vu^2(0,39574\ 95826 - 34,18858\ 87584u)$$

et il suffit de prendre $t < 0,12969$ (ce qui correspond à prendre $n \gg 768$) pour établir la première inégalité.

Ecrivons maintenant

$$\frac{v}{1+u} - f(z_0) = \left(\frac{v}{1+u} - f(t(1+c_2t))\right) + (f(t(1+c_2t)) - f(z_0))$$

et posons

$$a = t(1+c_2t) - z_0.$$

La formule de Taylor nous permet d'écrire

$$f(t(1+c_2t)) - f(z_0) = \frac{1}{2}a^2 f''(z_0 - \theta a) \quad \text{avec } 0 < \theta < 1$$

et, d'après le lemme 2, on a

$$0 < a < t^3 \quad \text{et} \quad f''(z_0 - \theta a) \ll f''(t(1+c_2t)),$$

ce qui, compte-tenu de l'inégalité

$$f''(t(1+c_2t)) \ll \frac{18\pi}{5n} t^{-5/2} (1+c_2t)^{-5/2} = \frac{3b_3}{10t} (1+c_2t)^{-5/2},$$

nous permet de déduire la majoration

$$(14) \quad f(t(1+c_2t)) - f(z_0) \ll \frac{3b_3t^3}{20} \left(t^2 - \frac{5}{2}c_2t^3 + \frac{35}{8}c_2^2t^4\right).$$

Nous avons, d'autre part,

$$\frac{v}{1+u} - f(t(1+c_2t)) = v(1-u+u^2-\dots) - \frac{2}{3}v(1-2u+6u^2-20u^3+\dots) - \frac{v}{3}(1+4u) + \\ + uv(1+8u+16u^2) - \frac{2b_7}{105}t^3(1+12u+48u^2+64u^3) + \dots ,$$

d'où il est facile d'obtenir une majoration pour le premier membre qui, ajoutée à (15), permet de majorer la différence $\frac{v}{1+u} - f(z_0)$. Des calculs très simples où interviennent les inégalités (6), (7), (8) et (11) en même temps que le fait que t doit appartenir à l'intervalle $0 < t < 0,1297$ nous permettent d'aboutir à l'inégalité

$$\frac{v}{1+u} - f(z_0) < 0,00849b_3t^3 \\ < 0,01592t^3 \\ < 11,471n^{-2} .$$

REMARQUE 2. Si, comme nous l'avons déjà fait dans la remarque 1, on fixe le rapport r_1/n , on obtient pour la constante :

$C = 4,554$ dans le cas totalement réel et

$C = 5,900$ dans le cas totalement imaginaire.

L'inégalité démontrée dans la proposition 2 pourrait être écrite sous la forme

$$\frac{v}{1+u} - f(z_0) < \frac{3b_3}{20}t^3 \left(\frac{5c_2^2}{4} - \frac{8b_7}{63b_3} \right) + o(t^3) \\ < Cn^{-2} + o(n^{-2}) ,$$

et on vérifie sans difficulté que la valeur de cette constante est

$C = 2,81531$ dans le cas totalement réel,

$C = 2,68340$ dans le cas totalement imaginaire et

$C = 2,96925$ pour le rapport $r_1/n = 0,45\dots$.

PROPOSITION 3. Pour $n \geq 976$ on a la majoration

$$0 < f(z_1) - f(z_0) < Cn^{-4} ,$$

avec $C = 24579$.

DÉMONSTRATION. La première inégalité est immédiate. Pour établir la seconde on définit

$$a = z_0 - z_1 ;$$

le lemme 2 nous montre que l'on a

$$|a| < t^3$$

et aussi que $|f'(z_1 + a\theta)|$ avec $0 < \theta < 1$ peut être majoré par $|f'(z_1)|$.

Il est facile d'encadrer la valeur de $f'(z_1)$, grâce à la série dérivée de celle servant à définir $f(z)$. Des calculs simples mais longs, où l'on utilise les lemmes 1 et 3, permettent d'établir que, pour $t < 0,11$ on a

$$-0,07079 \ 38229 \frac{b_3 t^3}{5} \ll f'(z_1) \ll 0,05750 \ 20271 \frac{b_3 t^3}{5} ,$$

d'où l'on déduit, finalement, l'inégalité

$$\begin{aligned} f(z_1) - f(z_0) &< 0,02654 t^6 \\ &< 24579 n^{-4} . \end{aligned}$$

REMARQUE 3. Comme dans les remarques précédentes, on peut obtenir dans le cas totalement réel

$$C = 1240 ,$$

et dans le cas totalement imaginaire

$$C = 5055 .$$

A partir de l'inégalité

$$\begin{aligned} f(z_1) - f(z_0) &< \left(\frac{81}{16} c_2^3 - \frac{27}{4} c_2 c_3 - \frac{40 b_9}{231 b_3} \right) \frac{b_3 t^6}{5} + o(t^6) \\ &< C n^{-4} + o(n^{-4}) \end{aligned}$$

on calcule sans difficulté les valeurs suivantes de la constante :

$C = 318$ dans le cas totalement réel,

$C = 407$ dans le cas totalement imaginaire et

$C = 451$ pour le rapport $r_1/n = 0,248\dots$.

N.B. On peut constater que les valeurs asymptotiques de C coïncident, dans le cas des remarques 1 et 2, avec les valeurs expérimentales. Il n'en est pas de même dans le cas de la remarque 3, ce qui semble dû au fait que la valeur de $|a|$ utilisée dans la démonstration de la proposition 3 est, en réalité, de l'ordre de $o(t^3)$.

4. CORRECTIONS LOCALES

On peut envisager les corrections locales de deux points de vue différents. On peut, tout d'abord, chercher à obtenir une minoration pour la racine n -ième du discriminant d'un corps K de degré n , ayant r_1 conjugués réels et $2r_2$ conjugués complexes, dans le cas où les nombres premiers rationnels appartenant à un ensemble fini S ont une décomposition en idéaux premiers de K fixée d'avance. Les corrections locales peuvent être alors très importantes s'il y a, par exemple, des idéaux premiers de K de petite norme absolue. La grande diversité des situations possibles et le fait que pour chacune d'elles la valeur de z_0 (la valeur optimum de y dans la notation de [P]) est différente, ne permettent pas d'envisager la construction de tables tenant compte des corrections locales.

Une autre manière d'aborder cette question des corrections locales consiste à ajouter à la minoration obtenue, pour un degré n et un rapport r_1/n fixés, un terme correcteur ([P], page 16) :

$$c(y) = \sum_p c_p,$$

où la correction c_p correspondant au nombre premier p est la plus petite des corrections que l'on obtient quand on considère toutes les décompositions possibles de l'idéal (p) dans une extension de degré n .

Il semble raisonnable d'espérer que la plus petite correction c_p corresponde au cas où l'idéal (p) reste inerte dans l'extension et c'est pour cela que nous avons commencé le calcul de la table 3 en cherchant la valeur de y qui rend minimum la fonction

$$(15) \quad \frac{12\pi}{5n} y^{-\frac{1}{2}} + L_1(y) - c(y) ,$$

avec

$$(16) \quad c(y) = \sum_{p \in S(n)} c_p(y) ,$$

où $S(n)$ est, dans nos calculs, un ensemble qui contient tous les nombres premiers plus petits que $\text{Min}(27450, \exp(30/n))$.

Chaque terme de la somme (16) peut être calculé au moyen de la formule

$$c_p(y) = 36 \log p \sum_{m=1}^{m_0} \frac{(\sin u/u - \cos u)^2}{u^4 (1+p^{nm})} ,$$

où on a posé $u = y^{\frac{1}{2}} nm \log p$ et où m_0 désigne le plus petit entier positif pour lequel on a l'inégalité

$$36 \log p \frac{(\sin u_0/u_0 - \cos u_0)^2}{u_0^4 (1+p^{nm_0})} < 10^{-16} ,$$

avec, bien entendu, $u_0 = y^{\frac{1}{2}} nm_0 \log p$.

Une fois calculée la valeur minimum de la fonction (15) nous avons cherché les nombres premiers p pour lesquels la correction $c_p(y)$ ci-dessus n'était pas la plus petite parmi les différents types de décomposition possibles pour l'idéal (p) dans une extension de degré n et nous avons modifié dans le sens qu'il fallait la minoration calculée précédemment. Cette correction n'a été nécessaire que pour les nombres premiers 7, 37, 1039, 1811, 5503, 5507, 9601, 16741 et 16747 dans le cas $n=2$, $r_1=0$; les nombres

premiers 3, 59, 263, 1163, 10861, 10867, 22871 et 22877 dans le cas $n=2$, $r_1=2$ et, finalement, pour 5 dans le cas $n=6$, $r_1=0$ et 7 dans le cas $n=8$, $r_1=8$.

La modification que nous avons dû effectuer dans les cas correspondant aux degrés 6 et 8 est négligeable et ne se reflète pas dans les 8 décimales de la minoration donnée par la table 3. Par contre, dans les deux cas quadratiques, la minoration a dû être ramenée de 1,72976442 (valeur obtenue en supposant que tous les nombres premiers considérés restent inertes dans l'extension) à 1,72976357 dans le cas imaginaire et de 2,22812978 (mêmes remarques) à 2,22800480 dans le cas réel. Puisque dans les extensions quadratiques on connaît bien la valeur exacte du plus petit discriminant (en valeur absolue), nous n'avons pas cherché à optimiser la minoration obtenue après la modification introduite par les nouvelles corrections locales.

Signalons, pour terminer, que la comparaison entre la table 3 et la table 4 permet d'apprécier l'importance de l'amélioration apportée à la minoration par les corrections locales. Cette comparaison montre clairement le peu d'intérêt que présente la prolongation de la table 3 à des degrés plus grands que 10 si l'on garde le même point de vue que nous avons adopté pour effectuer les corrections.

APPENDICE : AMELIORATION DE LA FORMULE (2)

En vue d'obtenir une formule finie qui donne une bonne approximation (par défaut, bien entendu) de la meilleure minoration pour $\frac{1}{n} \log |d|$ calculée selon la méthode des tables, G. POITOU a cherché à améliorer encore la formule (2) par l'adjonction d'un terme correcteur au dénominateur du second membre. Nous démontrerons ci-dessous que, pour les valeurs de n pour lesquelles elle est valable, la nouvelle formule donne une minoration plus précise que celle de la formule (2). Expérimentalement, nous avons vérifié que la nouvelle formule est valable pour $n \gg 6$ dans le cas totalement imaginaire et pour $n \gg 3$ dans le cas totalement réel.

Dans la démonstration de la proposition 4 nous utiliserons le lemme suivant dont la démonstration est immédiate et qui généralise le lemme 3 :

LEMME 4. L'inégalité

$$e^a \ll 1 + a + \frac{a^2}{2} + \dots + \frac{a^{n+1}}{n!n}$$

est valable pour $0 \ll a \ll \log(1+1/n)$ et $n \gg 1$.

PROPOSITION 4. Pour $n \gg 126000$ on a

$$0 \ll \frac{3b_3 t/5}{1 + c_2 t/4 + (c_2^2/16 + c_3/2)t^2/3} - f(z_0) \ll Cn^{-8/3}$$

avec $C = 6,43$.

DÉMONSTRATION. On modifie la notation utilisée dans la démonstration de la proposition 3 pour mieux faire ressortir les puissances de t :

$$v = 3b_3/5 \quad , \quad u = c_2/4 \quad , \quad w = (u^2 + \frac{1}{2}c_3)/3$$

et on pose

$$(17) \quad \frac{vt}{1+ut+wt^2} - f(z_0) = \left(\frac{vt}{1+ut+wt^2} - f(z_1) \right) + (f(z_1) - f(z_0)) \quad ,$$

avec $z_1 = t(1+c_3 t^2)e^{4ut} = t(1+2(3w-u^2)t^2)e^{4ut}$.

D'après la proposition 3 on a la majoration

$$(18) \quad f(z_1) - f(z_0) < 0,0236(3b_3/5)t^6$$

et, après quelques calculs, on obtient sans difficulté les inégalités

$$(19) \quad \frac{vt}{1+ut+wt^2} - f(z_1) > vt^4(u(14w-95u^2/3)+10b_9/693b_3-0,0327t)$$

et

$$(20) \quad \frac{vt}{1+ut+wt^2} - f(z_1) < vt^4 \left[u(14w-95u^2/3) + \frac{10b_9}{693b_3} + 0,03219 \ 32960t \right. \\ \left. + 0,00170 \ 95840t^2 + 0,00242 \ 99250t^3 + 0,00001 \ 03060t^4 \right. \\ \left. + 0,00000 \ 36500t^5 \right].$$

Pour n'importe quelle valeur du rapport $0 \ll r_1/n \ll 1$, on a :

$$(21) \quad 0,00014 \ 15700 \ll (14w-95u^2/3)u + \frac{10b_9}{693b_3} \ll 0,00058 \ 92790$$

et on déduit de (19) que la première inégalité de l'énoncé est valable pour $t < 0,004331$ (ce qui correspond à prendre $n \gg 126000$ environ). Finalement, en remplaçant dans (17) les inégalités (18) et (20), on obtient :

$$\frac{vt}{1+ut+wt^2} - f(z_0) < 0,00072 \ 37440vt^4 \\ < 6,43n^{-8/3}.$$

REMARQUE 4. La proposition 4 établit que la minoration donnée par la formule :

$$(22) \quad \frac{1}{n} \log |d| > \gamma + \log 4\pi + \frac{r_1}{n} - \frac{3b_3 t/5}{1+c_2 t/4+(c_2^2/16+\frac{1}{2}c_3)t^2/3}$$

$$\text{avec } t = \left(\frac{12\pi}{nb_3}\right)^{2/3}, \quad c_2 = \frac{12b_5}{35b_3}, \quad c_3 = \frac{7c_2^2 - 4b_7}{4c_2 - 21b_3} \text{ et } b_n = \lambda(n) + \frac{v_1}{n}\eta(n-1)$$

est juste pour $n \gg 126000$. En fait, comme il ressort des tableaux 5 et 6, la formule (22) est valable pour $n \gg 6$ dans le cas totalement imaginaire et pour $n \gg 3$ dans le cas totalement réel.

Tableau 5

(Cas totalement imaginaire)

n	y optimum	Minoration pour $\frac{1}{n} \log d $ donnée par		différence	C
		les tables	la formule (22)		
4	4,698272	1,1800574375	1,1838499737	$-3,7925 \times 10^{-3}$	-0,1529055
6	2,548450	1,5166792177	1,5166078211	$7,1397 \times 10^{-5}$	0,0084869
8	1,724196	1,7333112471	1,7327739995	$5,3725 \times 10^{-4}$	0,1375354
10	1,303027	1,8871214115	1,8866073204	$5,1409 \times 10^{-4}$	0,2386199
20	0,606698	2,2829639374	2,2827849926	$1,7894 \times 10^{-4}$	0,5273908
30	0,410495	2,4602110460	2,4601341399	$7,6906 \times 10^{-5}$	0,6682688
40	0,316877	2,5646417182	2,5646013999	$4,0318 \times 10^{-5}$	0,7545049
50	0,261431	2,6348327566	2,6348087705	$2,3986 \times 10^{-5}$	0,8138555
60	0,224451	2,6858588991	2,6858433534	$1,5546 \times 10^{-5}$	0,8577265
70	0,197862	2,7249435172	2,7249328024	$1,0715 \times 10^{-5}$	0,8917566
80	0,177726	2,7560226065	2,7560148717	$7,7348 \times 10^{-6}$	0,9190873
90	0,161887	2,7814411201	2,7814353316	$5,7885 \times 10^{-6}$	0,9416227
100	0,149064	2,8026912664	2,8026868078	$4,4587 \times 10^{-6}$	0,9605911
110	0,138443	2,8207720556	2,8207685391	$3,5164 \times 10^{-6}$	0,9768241
120	0,129482	2,8363798580	2,8363770295	$2,8285 \times 10^{-6}$	0,9909073
130	0,121807	2,8500163197	2,8500140064	$2,3133 \times 10^{-6}$	1,0032658
140	0,115150	2,8620528303	2,8620509111	$1,9192 \times 10^{-6}$	1,0142166
200	0,088243	2,9127924005	2,9127916250	$7,7547 \times 10^{-7}$	1,0608268
400	0,053467	2,9839246301	2,9839245003	$1,2980 \times 10^{-7}$	1,1274385
600	0,040170	3,0130005818	3,0130005367	$4,5105 \times 10^{-8}$	1,1551145
800	0,032870	3,0294497718	3,0294497506	$2,1230 \times 10^{-8}$	1,1708914
10^3	0,028164	3,0402436487	3,0402436369	$1,1813 \times 10^{-8}$	1,1812921
10^4	0,005900	3,0934879296	3,0934879296	$2,6568 \times 10^{-11}$	1,2331646
10^5	0,001264	3,1050569094	3,1050569094	$5,7730 \times 10^{-14}$	1,2436523
10^6	0,000272	3,1075539325	3,1075539325	$1,2000 \times 10^{-16}$	1,2469765

Tableau 6
(Cas totalement réel)

n	y optimum	Minoration pour $\frac{1}{n} \lg d $ donnée par		différence	c
		les tables	la formule (22)		
3	4,436999	1,2839397450	1,2430712723	$4,0868 \times 10^{-2}$	0,7650886
4	2,656608	1,6227650829	1,5986901458	$2,4075 \times 10^{-2}$	0,9706406
5	1,862470	1,8754157099	1,8602405440	$1,5175 \times 10^{-2}$	1,1093114
6	1,429495	2,0720941164	2,0619260416	$1,0168 \times 10^{-2}$	1,2086727
7	1,161245	2,2301995703	2,2230408002	$7,1588 \times 10^{-3}$	1,2836103
8	0,980028	2,3605210809	2,3552772551	$5,2438 \times 10^{-3}$	1,3424194
9	0,849817	2,4701157354	2,4661495623	$3,9662 \times 10^{-3}$	1,3900114
10	0,751868	2,5638003709	2,5607206785	$3,0797 \times 10^{-3}$	1,4294666
20	0,368071	3,0786707469	3,0781176818	$5,5307 \times 10^{-4}$	1,6300076
30	0,255277	3,3048360756	3,3046391143	$1,9696 \times 10^{-4}$	1,7114764
40	0,199981	3,4367767618	3,4366828382	$9,3924 \times 10^{-5}$	1,7576606
50	0,166630	3,5249136786	3,5248609807	$5,2698 \times 10^{-5}$	1,7880537
60	0,144090	3,5887129298	3,5886801273	$3,2802 \times 10^{-5}$	1,8098528
70	0,127718	3,6374270429	3,6374050980	$2,1945 \times 10^{-5}$	1,8263941
80	0,115220	3,6760682269	3,6760527465	$1,5480 \times 10^{-5}$	1,8394562
90	0,105325	3,7076092299	3,7075978568	$1,1373 \times 10^{-5}$	1,8500818
100	0,097269	3,7339350053	3,7339263769	$8,6284 \times 10^{-6}$	1,8589268
500	0,030617	3,9775912128	3,9775910896	$1,2318 \times 10^{-7}$	1,9399403
10^3	0,018987	4,0256151062	4,0256150867	$1,9558 \times 10^{-8}$	1,9557638
10^4	0,004006	4,0903463030	4,0903463029	$4,2594 \times 10^{-11}$	1,9770379
10^5	0,000859	4,1043805450	4,1043805450	$9,1970 \times 10^{-14}$	1,9814620
10^6	0,000185	4,1074082365	4,1074082365	$2,0000 \times 10^{-16}$	1,9826161

TABLE 1 CAS TOTALEMENT IMAGINAIRE

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
2	1.72211973	102	16.55246755	202	18.43131688	302	19.27509412
4	3.25456113	104	16.61422999	204	18.45416092	304	19.28749557
6	4.55706701	106	16.67432707	206	18.47667001	306	19.29977178
8	5.65936246	108	16.73283064	208	18.49885201	308	19.31192476
10	6.60034164	110	16.78980833	210	18.52071455	310	19.32395651
12	7.41287924	112	16.84532333	212	18.54226501	312	19.33586896
14	8.12243771	114	16.89943720	214	18.56351054	314	19.34766402
16	8.74841810	116	16.95220515	216	18.58445805	316	19.35934353
18	9.30567232	118	17.00368122	218	18.60511425	318	19.37090932
20	9.80570086	120	17.05391605	220	18.62548565	320	19.38236316
22	10.25752840	122	17.10295758	222	18.64557853	322	19.39370679
24	10.66833176	124	17.15085119	224	18.66539901	324	19.40494191
26	11.04389070	126	17.19763992	226	18.68495301	326	19.41607019
28	11.38891460	128	17.24336459	228	18.70424628	328	19.42709326
30	11.70728205	130	17.28806397	230	18.72328439	330	19.43801271
32	12.00221881	132	17.33177488	232	18.74207276	332	19.44883011
34	12.27643183	134	17.37453233	234	18.76061665	334	19.45954698
36	12.53221127	136	17.41636966	236	18.77892115	336	19.47016483
38	12.77150927	138	17.45731857	238	18.79699122	338	19.48068512
40	12.99600130	140	17.49740930	240	18.81483169	340	19.49110930
42	13.20713446	142	17.53667067	242	18.83244723	342	19.50143876
44	13.40616594	144	17.57513017	244	18.84984238	344	19.51167490
46	13.59419382	146	17.61281404	246	18.86702159	346	19.52181906
48	13.77218205	148	17.64974735	248	18.88398913	348	19.53187258
50	13.94098073	150	17.68595406	250	18.90074921	350	19.54183674
52	14.10134283	152	17.72145708	252	18.91730588	352	19.55171282
54	14.25393801	154	17.75627834	254	18.93366311	354	19.56150209
56	14.39936405	156	17.79043881	256	18.94982475	356	19.57120574
58	14.53815649	158	17.82395859	258	18.96579456	358	19.58082500
60	14.67079670	160	17.85685695	260	18.98157619	360	19.59036104
62	14.79771873	162	17.88915235	262	18.99717319	362	19.59981501
64	14.91931511	164	17.92086252	264	19.01258903	364	19.60918804
66	15.03594180	166	17.95200444	266	19.02782709	366	19.61848125
68	15.14792249	168	17.98259445	268	19.04289066	368	19.62769573
70	15.25555222	170	18.01264823	270	19.05778293	370	19.63683255
72	15.35910058	172	18.04218085	272	19.07250705	372	19.64589276
74	15.45881444	174	18.07120680	274	19.08706604	374	19.65487739
76	15.55492039	176	18.09974002	276	19.10146289	376	19.66378745
78	15.64762677	178	18.12779391	278	19.11570049	378	19.67262393
80	15.73712556	180	18.15538139	280	19.12978167	380	19.68138781
82	15.82359399	182	18.18251490	282	19.14370919	382	19.69008005
84	15.90719593	184	18.20920641	284	19.15748573	384	19.69870158
86	15.98808820	186	18.23546747	286	19.17111392	386	19.70725334
88	16.06639664	188	18.26130921	288	19.18459637	388	19.71573622
90	16.14226714	190	18.28674236	290	19.19793544	390	19.72415111
92	16.21581659	192	18.31177730	292	19.21113372	392	19.73249889
94	16.28715827	194	18.33642401	294	19.22419355	394	19.74078042
96	16.35639838	196	18.36069216	296	19.23711725	396	19.74899654
98	16.42363584	198	18.38459106	298	19.24990711	398	19.75714808
100	16.48896330	200	18.40812973	300	19.26256534	400	19.76523586

TABLE 1 CAS TOTALEMENT IMAGINAIRE

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
402	19.77326067	502	20.10858071	602	20.35260685	702	20.53967840
404	19.78122331	504	20.11420224	604	20.35682604	704	20.54298353
406	19.78912454	506	20.11978870	606	20.36102311	706	20.54627372
408	19.79696512	508	20.12534042	608	20.36519825	708	20.54954907
410	19.80474581	510	20.13085776	610	20.36935164	710	20.55280970
412	19.81246733	512	20.13634105	612	20.37348345	712	20.55605570
414	19.82013041	514	20.14179064	614	20.37759388	714	20.55928718
416	19.82773575	516	20.14720686	616	20.38168310	716	20.56250426
418	19.83528406	518	20.15259003	618	20.38575128	718	20.56570702
420	19.84277603	520	20.15794047	620	20.38979859	720	20.56889558
422	19.85021232	522	20.16325851	622	20.39382522	722	20.57207003
424	19.85759359	524	20.16854447	624	20.39783132	724	20.57523048
426	19.86492052	526	20.17379865	626	20.40181707	726	20.57837702
428	19.87219373	528	20.17902135	628	20.40578264	728	20.58150975
430	19.87941385	530	20.18421289	630	20.40972818	730	20.58462877
432	19.88658151	532	20.18937355	632	20.41365385	732	20.58773418
434	19.89369733	534	20.19450364	634	20.41755983	734	20.59082606
436	19.90076190	536	20.19960345	636	20.42144626	736	20.59390452
438	19.90777581	538	20.20467325	638	20.42531331	738	20.59696965
440	19.91473965	540	20.20971334	640	20.42916113	740	20.60002154
442	19.92165398	542	20.21472400	642	20.43298987	742	20.60306028
444	19.92851939	544	20.21970549	644	20.43679968	744	20.60608597
446	19.93533641	546	20.22465810	646	20.44059072	746	20.60909869
448	19.94210561	548	20.22958208	648	20.44436314	748	20.61209853
450	19.94882751	550	20.23447772	650	20.44811707	750	20.61508558
452	19.95550264	552	20.23934526	652	20.45185267	752	20.61805993
454	19.96213154	554	20.24418497	654	20.45557007	754	20.62102167
456	19.96871471	556	20.24899710	656	20.45926943	756	20.62397087
458	19.97525265	558	20.25378190	658	20.46295088	758	20.62690763
460	19.98174587	560	20.25853963	660	20.46661456	760	20.62983204
462	19.98819487	562	20.26327052	662	20.47026061	762	20.63274416
464	19.99460011	564	20.26797483	664	20.47388916	764	20.63564409
466	20.00096208	566	20.27265279	666	20.47750035	766	20.63853191
468	20.00728124	568	20.27730464	668	20.48109431	768	20.64140770
470	20.01355807	570	20.28193061	670	20.48467118	770	20.64427154
472	20.01979301	572	20.28653093	672	20.48823108	772	20.64712350
474	20.02598651	574	20.29110583	674	20.49177415	774	20.64996368
476	20.03213901	576	20.29565554	676	20.49530050	776	20.65279214
478	20.03825096	578	20.30018028	678	20.49881028	778	20.65560896
480	20.04432277	580	20.30468027	680	20.50230359	780	20.65841423
482	20.05035487	582	20.30915572	682	20.50578058	782	20.66120801
484	20.05634769	584	20.31360685	684	20.50924135	784	20.66399039
486	20.06230162	586	20.31803388	686	20.51268603	786	20.66676143
488	20.06821707	588	20.32243701	688	20.51611474	788	20.66952121
490	20.07409445	590	20.32681645	690	20.51952760	790	20.67226980
492	20.07993414	592	20.33117240	692	20.52292473	792	20.67500729
494	20.08573653	594	20.33550507	694	20.52630624	794	20.67773373
496	20.09150201	596	20.33981465	696	20.52967225	796	20.68044920
498	20.09723096	598	20.34410134	698	20.53302287	798	20.68315377
500	20.10292373	600	20.34836535	700	20.53635822	800	20.68584752

TABLE 1 CAS TOTALEMENT IMAGINAIRE

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
802	20.68853050	902	20.81033664	1002	20.91221326	1102	20.99892822
804	20.69120280	904	20.81255051	1004	20.91409312	1104	21.00053253
806	20.69386447	906	20.81475653	1006	20.91594700	1106	21.00213216
808	20.69651559	908	20.81695474	1008	20.91780491	1108	21.00372713
810	20.69915622	910	20.81914518	1010	20.91965690	1110	21.00531745
812	20.70178643	912	20.82132791	1012	20.92150300	1112	21.00690316
814	20.70440629	914	20.82350297	1014	20.92334322	1114	21.00848428
816	20.70701586	916	20.82567039	1016	20.92517762	1116	21.01006082
818	20.70961520	918	20.82783022	1018	20.92700620	1118	21.01163281
820	20.71220438	920	20.82998250	1020	20.92882902	1120	21.01320026
822	20.71478347	922	20.83212729	1022	20.93064608	1122	21.01476321
824	20.71735252	924	20.83426460	1024	20.93245742	1124	21.01632166
826	20.71991161	926	20.83639450	1026	20.93426308	1126	21.01787565
828	20.72246078	928	20.83851702	1028	20.93606307	1128	21.01942518
830	20.72500011	930	20.84063220	1030	20.93785744	1130	21.02097029
832	20.72752965	932	20.84274009	1032	20.93964619	1132	21.02251099
834	20.73004946	934	20.84484072	1034	20.94142938	1134	21.02404731
836	20.73255961	936	20.84693413	1036	20.94320701	1136	21.02557925
838	20.73506016	938	20.84902036	1038	20.94497913	1138	21.02710685
840	20.73755115	940	20.85109945	1040	20.94674575	1140	21.02863011
842	20.74003266	942	20.85317145	1042	20.94850690	1142	21.03014907
844	20.74250474	944	20.85523639	1044	20.95026262	1144	21.03166374
846	20.74496744	946	20.85729430	1046	20.95201293	1146	21.03317415
848	20.74742083	948	20.85934523	1048	20.95375785	1148	21.03468030
850	20.74986496	950	20.86138922	1050	20.95549741	1150	21.03618222
852	20.75229988	952	20.86342630	1052	20.95723164	1152	21.03767992
854	20.75472566	954	20.86545651	1054	20.95896057	1154	21.03917344
856	20.75714234	956	20.86747989	1056	20.96068421	1156	21.04066278
858	20.75954999	958	20.86949647	1058	20.96240260	1158	21.04214796
860	20.76194865	960	20.87150629	1060	20.96411577	1160	21.04362901
862	20.76433838	962	20.87350939	1062	20.96582373	1162	21.04510594
864	20.76671923	964	20.87550581	1064	20.96752651	1164	21.04657877
866	20.76909126	966	20.87740557	1066	20.96922414	1166	21.04804752
868	20.77145452	968	20.87947872	1068	20.97091665	1168	21.04951220
870	20.77380906	970	20.88145528	1070	20.97260405	1170	21.05097284
872	20.77615493	972	20.88342531	1072	20.97428638	1172	21.05242945
874	20.77849218	974	20.88538882	1074	20.97596365	1174	21.05388205
876	20.78082086	976	20.88734585	1076	20.97763589	1176	21.05533066
878	20.78314104	978	20.88929645	1078	20.97930313	1178	21.05677529
880	20.78545274	980	20.89124063	1080	20.98096539	1180	21.05821596
882	20.78775603	982	20.89317845	1082	20.98262269	1182	21.05965270
884	20.79005095	984	20.89510992	1084	20.98427506	1184	21.06108551
886	20.79233756	986	20.89703508	1086	20.98592252	1186	21.06251442
888	20.79461589	988	20.89895398	1088	20.98756509	1188	21.06393944
890	20.79688600	990	20.90086663	1090	20.98920280	1190	21.06536059
892	20.79914794	992	20.90277307	1092	20.99083567	1192	21.06677788
894	20.80140175	994	20.90466733	1094	20.99246372	1194	21.06819134
896	20.80364748	996	20.90656745	1096	20.99408698	1196	21.06960097
898	20.80588517	998	20.90845546	1098	20.99570547	1198	21.07100680
900	20.80811488	1000	20.91033739	1100	20.99731921	1200	21.07240885

TABLE 1 CAS TOTALEMENT IMAGINAIRE

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
1202	21.07380712	1302	21.13924692	1402	21.19702309	1502	21.24848133
1204	21.07520163	1304	21.14047246	1404	21.19811027	1504	21.24945362
1206	21.07659241	1306	21.14169495	1406	21.19919493	1506	21.25042381
1208	21.07797946	1308	21.14291442	1408	21.20027711	1508	21.25139191
1210	21.07936281	1310	21.14413088	1410	21.20135679	1510	21.25235793
1212	21.08074246	1312	21.14534432	1412	21.20243399	1512	21.25332187
1214	21.08211844	1314	21.14655478	1414	21.20350872	1514	21.25428375
1216	21.08349076	1316	21.14776226	1416	21.20458098	1516	21.25524356
1218	21.08485943	1318	21.14896677	1418	21.20565080	1518	21.25620132
1220	21.08622448	1320	21.15016833	1420	21.20671817	1520	21.25715704
1222	21.08758591	1322	21.15136694	1422	21.20778311	1522	21.25811072
1224	21.08894375	1324	21.15256262	1424	21.20884562	1524	21.25906236
1226	21.09029800	1326	21.15375537	1426	21.20990571	1526	21.26001198
1228	21.09164869	1328	21.15494522	1428	21.21096339	1528	21.26095958
1230	21.09299582	1330	21.15613217	1430	21.21201868	1530	21.26190516
1232	21.09433941	1332	21.15731623	1432	21.21307157	1532	21.26284875
1234	21.09567949	1334	21.15849741	1434	21.21412208	1534	21.26379033
1236	21.09701605	1336	21.15967573	1436	21.21517022	1536	21.26472993
1238	21.09834912	1338	21.16085120	1438	21.21621600	1538	21.26566753
1240	21.09967872	1340	21.16202382	1440	21.21725941	1540	21.26660317
1242	21.10100484	1342	21.16319362	1442	21.21830048	1542	21.26753682
1244	21.10232752	1344	21.16436059	1444	21.21933921	1544	21.26846852
1246	21.10364677	1346	21.16552475	1446	21.22037561	1546	21.26939826
1248	21.10496259	1348	21.16668612	1448	21.22140969	1548	21.27032604
1250	21.10627501	1350	21.16784469	1450	21.22244145	1550	21.27125189
1252	21.10758404	1352	21.16900049	1452	21.22347090	1552	21.27217570
1254	21.10888968	1354	21.17015352	1454	21.22449806	1554	21.27309776
1256	21.11019197	1356	21.17130380	1456	21.22552293	1556	21.27401781
1258	21.11149090	1358	21.17245133	1458	21.22654552	1558	21.27493594
1260	21.11278650	1360	21.17359612	1460	21.22756583	1560	21.27585215
1262	21.11407877	1362	21.17473819	1462	21.22858388	1562	21.27676646
1264	21.11536773	1364	21.17587755	1464	21.22959967	1564	21.27767887
1266	21.11665340	1366	21.17701420	1466	21.23061322	1566	21.27858939
1268	21.11793579	1368	21.17814816	1468	21.23162452	1568	21.27949802
1270	21.11921490	1370	21.17927944	1470	21.23263359	1570	21.28040477
1272	21.12049077	1372	21.18040804	1472	21.23364043	1572	21.28130964
1274	21.12176339	1374	21.18153398	1474	21.23464506	1574	21.28221265
1276	21.12303278	1376	21.18265727	1476	21.23564748	1576	21.28311379
1278	21.12429895	1378	21.18377791	1478	21.23664769	1578	21.28401309
1280	21.12556193	1380	21.18489593	1480	21.23764571	1580	21.28491052
1282	21.12682171	1382	21.18601132	1482	21.23864155	1582	21.28580612
1284	21.12807832	1384	21.18712409	1484	21.23963520	1584	21.28669987
1286	21.12933176	1386	21.18823426	1486	21.24062669	1586	21.28759186
1288	21.13058205	1388	21.18934184	1488	21.24161601	1588	21.28848190
1290	21.13182921	1390	21.19044684	1490	21.24260318	1590	21.28937018
1292	21.13307323	1392	21.19154926	1492	21.24358820	1592	21.29025665
1294	21.13431415	1394	21.19264912	1494	21.24457108	1594	21.29114131
1296	21.13555196	1396	21.19374642	1496	21.24555182	1596	21.29202417
1298	21.13678669	1398	21.19484117	1498	21.24653044	1598	21.29290523
1300	21.13801834	1400	21.19593340	1500	21.24750694	1600	21.29378450

TABLE 1 CAS TOTALEMENT IMAGINAIRE

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
1602	21.29466199	1702	21.33638315	1802	21.37429787	1902	21.40893431
1604	21.29553770	1704	21.33717681	1804	21.37502114	1904	21.40959671
1606	21.29641163	1706	21.33796895	1806	21.37574311	1906	21.41025797
1608	21.29728380	1708	21.33875958	1808	21.37646378	1908	21.41091811
1610	21.29815421	1710	21.33954871	1810	21.37718315	1910	21.41157711
1612	21.29902287	1712	21.34033633	1812	21.37790123	1912	21.41223500
1614	21.29988977	1714	21.34112246	1814	21.37861802	1914	21.41289176
1616	21.30075493	1716	21.34190710	1816	21.37933352	1916	21.41354741
1618	21.30161835	1718	21.34269026	1818	21.38004774	1918	21.41420194
1620	21.30248004	1720	21.34347193	1820	21.38076069	1920	21.41485536
1622	21.30334000	1722	21.34425212	1822	21.38147236	1922	21.41550767
1624	21.30419824	1724	21.34503084	1824	21.38218275	1924	21.41615888
1626	21.30505476	1726	21.34580810	1826	21.38289188	1926	21.41680899
1628	21.30590958	1728	21.34658389	1828	21.38359975	1928	21.41745799
1630	21.30676268	1730	21.34735822	1830	21.38430636	1930	21.41810590
1632	21.30761409	1732	21.34813109	1832	21.38501171	1932	21.41875272
1634	21.30846380	1734	21.34890252	1834	21.38571581	1934	21.41939844
1636	21.30931183	1736	21.34967249	1836	21.38641865	1936	21.42004308
1638	21.31015817	1738	21.35044103	1838	21.38712026	1938	21.42068663
1640	21.31100283	1740	21.35120813	1840	21.38782062	1940	21.42132911
1642	21.31184582	1742	21.35197379	1842	21.38851974	1942	21.42197050
1644	21.31268714	1744	21.35273803	1844	21.38921762	1944	21.42261082
1646	21.31352680	1746	21.35350084	1846	21.38991428	1946	21.42325006
1648	21.31436481	1748	21.35426223	1848	21.39060970	1948	21.42388824
1650	21.31520116	1750	21.35502220	1850	21.39130391	1950	21.42452534
1652	21.31603586	1752	21.35578076	1852	21.39199689	1952	21.42516139
1654	21.31686892	1754	21.35653792	1854	21.39268865	1954	21.42579637
1656	21.31770035	1756	21.35729367	1856	21.39337920	1956	21.42643029
1658	21.31853015	1758	21.35804802	1858	21.39406853	1958	21.42706316
1660	21.31935832	1760	21.35880097	1860	21.39475666	1960	21.42769497
1662	21.32018487	1762	21.35955253	1862	21.39544359	1962	21.42832574
1664	21.32100990	1764	21.36030271	1864	21.39612931	1964	21.42895546
1666	21.32183312	1766	21.36105150	1866	21.39681384	1966	21.42958413
1668	21.32265484	1768	21.36179892	1868	21.39749717	1968	21.43021176
1670	21.32347496	1770	21.36254496	1870	21.39817931	1970	21.43083835
1672	21.32429246	1772	21.36328963	1872	21.39886027	1972	21.43146391
1674	21.32511041	1774	21.36403293	1874	21.39954004	1974	21.43208843
1676	21.32592575	1776	21.36477487	1876	21.40021863	1976	21.43271192
1678	21.32673952	1778	21.36551545	1878	21.40089604	1978	21.43333438
1680	21.32755170	1780	21.36625467	1880	21.40157228	1980	21.43395582
1682	21.32836232	1782	21.36699255	1882	21.40224734	1982	21.43457624
1684	21.32917137	1784	21.36772908	1884	21.40292124	1984	21.43519563
1686	21.32997886	1786	21.36846426	1886	21.40359398	1986	21.43581401
1688	21.33078489	1788	21.36919811	1888	21.40426555	1988	21.43643137
1690	21.33158918	1790	21.36993062	1890	21.40493596	1990	21.43704772
1692	21.33239201	1792	21.37066180	1892	21.40560522	1992	21.43766307
1694	21.33319331	1794	21.37139165	1894	21.40627333	1994	21.43827740
1696	21.33399306	1796	21.37212018	1896	21.40694029	1996	21.43889073
1698	21.33479129	1798	21.37284739	1898	21.40760610	1998	21.43950307
1700	21.33558798	1800	21.37357328	1900	21.40827078	2000	21.44011440

TABLE 1 CAS TOTALEMENT IMAGINAIRE

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
2002	21.44072473	2102	21.47002659	2202	21.49713831	2302	21.52231114
2004	21.44133408	2104	21.47058938	2204	21.49766000	2304	21.52279634
2006	21.44194243	2106	21.47115130	2206	21.49818091	2306	21.52328085
2008	21.44254979	2108	21.47171235	2208	21.49870106	2308	21.52376468
2010	21.44315617	2110	21.47227253	2210	21.49922044	2310	21.52424782
2012	21.44376156	2112	21.47283184	2212	21.49973905	2312	21.52473028
2014	21.44436598	2114	21.47339029	2214	21.50025690	2314	21.52521205
2016	21.44496941	2116	21.47394788	2216	21.50077398	2316	21.52569315
2018	21.44557187	2118	21.47450461	2218	21.50129030	2318	21.52617357
2020	21.44617336	2120	21.47506048	2220	21.50180586	2320	21.52665331
2022	21.44677388	2122	21.47561549	2222	21.50232066	2322	21.52713238
2024	21.44737342	2124	21.47616966	2224	21.50283471	2324	21.52761078
2026	21.44797201	2126	21.47672297	2226	21.50334800	2326	21.52808850
2028	21.44856963	2128	21.47727543	2228	21.50386054	2328	21.52856555
2030	21.44916629	2130	21.47782705	2230	21.50437233	2330	21.52904193
2032	21.44976199	2132	21.47837782	2232	21.50488337	2332	21.52951764
2034	21.45035674	2134	21.47892775	2234	21.50539366	2334	21.52999269
2036	21.45095053	2136	21.47947684	2236	21.50590321	2336	21.53046707
2038	21.45154337	2138	21.48002509	2238	21.50641202	2338	21.53094079
2040	21.45213527	2140	21.48057250	2240	21.50692008	2340	21.53141385
2042	21.45272621	2142	21.48111908	2242	21.50742740	2342	21.53188624
2044	21.45331622	2144	21.48166483	2244	21.50793398	2344	21.53235798
2046	21.45390528	2146	21.48220974	2246	21.50843982	2346	21.53282906
2048	21.45449341	2148	21.48275383	2248	21.50894493	2348	21.53329949
2050	21.45508060	2150	21.48329709	2250	21.50944931	2350	21.53376926
2052	21.45566685	2152	21.48383953	2252	21.50995296	2352	21.53423838
2054	21.45625218	2154	21.48438114	2254	21.51045587	2354	21.53470684
2056	21.45683657	2156	21.48492194	2256	21.51095806	2356	21.53517466
2058	21.45742004	2158	21.48546191	2258	21.51145952	2358	21.53564183
2060	21.45800259	2160	21.48600107	2260	21.51196025	2360	21.53610835
2062	21.45858421	2162	21.48653942	2262	21.51246026	2362	21.53657422
2064	21.45916491	2164	21.48707695	2264	21.51295955	2364	21.53703945
2066	21.45974470	2166	21.48761368	2266	21.51345812	2366	21.53750404
2068	21.46032357	2168	21.48814959	2268	21.51395597	2368	21.53796799
2070	21.46090153	2170	21.48868470	2270	21.51445311	2370	21.53843129
2072	21.46147857	2172	21.48921900	2272	21.51494953	2372	21.53889396
2074	21.46205471	2174	21.48975250	2274	21.51544524	2374	21.53935599
2076	21.46262995	2176	21.49028520	2276	21.51594023	2376	21.53981738
2078	21.46320428	2178	21.49081710	2278	21.51643452	2378	21.54027814
2080	21.46377771	2180	21.49134821	2280	21.51692809	2380	21.54073827
2082	21.46435024	2182	21.49187852	2282	21.51742096	2382	21.54119777
2084	21.46492187	2184	21.49240803	2284	21.51791313	2384	21.54165663
2086	21.46549261	2186	21.49293676	2286	21.51840459	2386	21.54211487
2088	21.46606246	2188	21.49346470	2288	21.51889534	2388	21.54257248
2090	21.46663142	2190	21.49399184	2290	21.51938540	2390	21.54302946
2092	21.46719948	2192	21.49451821	2292	21.51987476	2392	21.54348582
2094	21.46776667	2194	21.49504379	2294	21.52036343	2394	21.54394155
2096	21.46833207	2196	21.49556859	2296	21.52085139	2396	21.54439666
2098	21.46889839	2198	21.49609260	2298	21.52133867	2398	21.54485116
2100	21.46946293	2200	21.49661584	2300	21.52182525	2400	21.54530503

TABLE 1 CAS TOTALEMENT IMAGINAIRE

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
2402	21.54575828	2502	21.56766196	2602	21.58817888	2702	21.60744468
2404	21.54621092	2504	21.56808540	2604	21.58857604	2704	21.60781807
2406	21.54666295	2506	21.56850830	2606	21.58897270	2706	21.60819101
2408	21.54711436	2508	21.56893064	2608	21.58936886	2708	21.60856350
2410	21.54756515	2510	21.56935242	2610	21.58976452	2710	21.60893554
2412	21.54801534	2512	21.56977366	2612	21.59015959	2712	21.60930713
2414	21.54846491	2514	21.57019436	2614	21.59055436	2714	21.60967827
2416	21.54891388	2516	21.57061450	2616	21.59094854	2716	21.61004896
2418	21.54936224	2518	21.57103410	2618	21.59134223	2718	21.61041921
2420	21.54981000	2520	21.57145315	2620	21.59173542	2720	21.61078901
2422	21.55025715	2522	21.57187166	2622	21.59212812	2722	21.61115836
2424	21.55070369	2524	21.57228963	2624	21.59252034	2724	21.61152727
2426	21.55114964	2526	21.57270706	2626	21.59291206	2726	21.61189574
2428	21.55159498	2528	21.57312394	2628	21.59330330	2728	21.61226377
2430	21.55203972	2530	21.57354029	2630	21.59369405	2730	21.61263135
2432	21.55248387	2532	21.57395610	2632	21.59408431	2732	21.61299850
2434	21.55292742	2534	21.57437137	2634	21.59447409	2734	21.61336520
2436	21.55337037	2536	21.57478611	2636	21.59486338	2736	21.61373147
2438	21.55381273	2538	21.57520031	2638	21.59525219	2738	21.61409729
2440	21.55425450	2540	21.57561398	2640	21.59564052	2740	21.61446268
2442	21.55469568	2542	21.57602711	2642	21.59602837	2742	21.61482764
2444	21.55513626	2544	21.57643972	2644	21.59641574	2744	21.61519216
2446	21.55557626	2546	21.57685179	2646	21.59680262	2746	21.61555624
2448	21.55601566	2548	21.57726333	2648	21.59718903	2748	21.61591989
2450	21.55645448	2550	21.57767435	2650	21.59757497	2750	21.61628310
2452	21.55689272	2552	21.57808484	2652	21.59796042	2752	21.61664589
2454	21.55733037	2554	21.57849480	2654	21.59834540	2754	21.61700824
2456	21.55776744	2556	21.57890424	2656	21.59872991	2756	21.61737016
2458	21.55820393	2558	21.57931315	2658	21.59911394	2758	21.61773165
2460	21.55863983	2560	21.57972155	2660	21.59949750	2760	21.61809271
2462	21.55907516	2562	21.58012942	2662	21.59988059	2762	21.61845335
2464	21.55951091	2564	21.58053677	2664	21.60026320	2764	21.61881355
2466	21.55994408	2566	21.58094359	2666	21.60064535	2766	21.61917333
2468	21.56037768	2568	21.58134991	2668	21.60102703	2768	21.61953269
2470	21.56081070	2570	21.58175570	2670	21.60140824	2770	21.61989162
2472	21.56124315	2572	21.58216098	2672	21.60178898	2772	21.62025012
2474	21.56167503	2574	21.58256574	2674	21.60216926	2774	21.62060821
2476	21.56210634	2576	21.58296999	2676	21.60254907	2776	21.62096587
2478	21.56253708	2578	21.58337372	2678	21.60292841	2778	21.62132310
2480	21.56296725	2580	21.58377694	2680	21.60330730	2780	21.62167992
2482	21.56339685	2582	21.58417966	2682	21.60368572	2782	21.62203632
2484	21.56382589	2584	21.58458186	2684	21.60406368	2784	21.62239229
2486	21.56425436	2586	21.58498355	2686	21.60444117	2786	21.62274785
2488	21.56468227	2588	21.58538473	2688	21.60481821	2788	21.62310299
2490	21.56511062	2590	21.58578541	2690	21.60519479	2790	21.62345772
2492	21.56553640	2592	21.58618558	2692	21.60557091	2792	21.62381203
2494	21.56596263	2594	21.58658525	2694	21.60594658	2794	21.62416592
2496	21.56638830	2596	21.58698441	2696	21.60632178	2796	21.62451940
2498	21.56681341	2598	21.58738307	2698	21.60669654	2798	21.62487246
2500	21.56723796	2600	21.58778123	2700	21.60707083	2800	21.62522511

TABLE 1 CAS TOTALEMENT IMAGINAIRE

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
2802	21.62557735	2902	21.64268010	3002	21.65884361	3102	21.67414795
2804	21.62592917	2904	21.64301229	3004	21.65915787	3104	21.67444578
2806	21.62628059	2906	21.643334410	3006	21.65947178	3106	21.67474329
2808	21.62663160	2908	21.64367555	3008	21.65978536	3108	21.67504048
2810	21.62698219	2910	21.64400662	3010	21.66009858	3110	21.67533736
2812	21.62733238	2912	21.64433731	3012	21.66041147	3112	21.67563393
2814	21.62768216	2914	21.64466764	3014	21.66072402	3114	21.67593019
2816	21.62803154	2916	21.64499759	3016	21.66103623	3116	21.67622614
2818	21.62838050	2918	21.64532718	3018	21.66134810	3118	21.67652177
2820	21.62872906	2920	21.64565639	3020	21.66165963	3120	21.67681709
2822	21.62907722	2922	21.64598523	3022	21.66197082	3122	21.67711211
2824	21.62942498	2924	21.64631371	3024	21.66228168	3124	21.67740681
2826	21.62977233	2926	21.64664182	3026	21.66259220	3126	21.67770120
2828	21.63011927	2928	21.64696956	3028	21.66290238	3128	21.67799529
2830	21.63046582	2930	21.64729693	3030	21.66321223	3130	21.67828907
2832	21.63081196	2932	21.64762394	3032	21.66352174	3132	21.67858253
2834	21.63115771	2934	21.64795058	3034	21.66383091	3134	21.67887570
2836	21.63150305	2936	21.64827686	3036	21.66413976	3136	21.67916855
2838	21.63184800	2938	21.64860277	3038	21.66444827	3138	21.67946110
2840	21.63219255	2940	21.64892832	3040	21.66475644	3140	21.67975335
2842	21.63253670	2942	21.64925351	3042	21.66506429	3142	21.68004528
2844	21.63288046	2944	21.64957833	3044	21.66537180	3144	21.68033692
2846	21.63322381	2946	21.64990280	3046	21.66567898	3146	21.68062825
2848	21.63356678	2948	21.65022690	3048	21.66598584	3148	21.68091927
2850	21.63390935	2950	21.65055064	3050	21.66629236	3150	21.68121000
2852	21.63425152	2952	21.65087403	3052	21.66659855	3152	21.68150042
2854	21.63459331	2954	21.65119705	3054	21.66690441	3154	21.68179054
2856	21.63493470	2956	21.65151972	3056	21.66720995	3156	21.68208035
2858	21.63527570	2958	21.65184203	3058	21.66751516	3158	21.68236987
2860	21.63561631	2960	21.65216398	3060	21.66782004	3160	21.68265909
2862	21.63595653	2962	21.65248557	3062	21.66812459	3162	21.68294800
2864	21.63629636	2964	21.65280681	3064	21.66842882	3164	21.68323662
2866	21.63663580	2966	21.65312770	3066	21.66873272	3166	21.68352493
2868	21.63697485	2968	21.65344823	3068	21.66903630	3168	21.68381295
2870	21.63731352	2970	21.65376840	3070	21.66933955	3170	21.68410067
2872	21.63765180	2972	21.65408823	3072	21.66964248	3172	21.68438809
2874	21.63798969	2974	21.65440770	3074	21.66994509	3174	21.68467522
2876	21.63832720	2976	21.65472682	3076	21.67024737	3176	21.68496205
2878	21.63866432	2978	21.65504558	3078	21.67054933	3178	21.68524858
2880	21.63900106	2980	21.65536400	3080	21.67085097	3180	21.68553482
2882	21.63933742	2982	21.65568207	3082	21.67115229	3182	21.68582076
2884	21.63967340	2984	21.65599978	3084	21.67145329	3184	21.68610641
2886	21.64000899	2986	21.65631715	3086	21.67175397	3186	21.68639176
2888	21.64034421	2988	21.65663417	3088	21.67205433	3188	21.68667682
2890	21.64067904	2990	21.65695084	3090	21.67235437	3190	21.68696159
2892	21.64101349	2992	21.65726717	3092	21.67265409	3192	21.68724606
2894	21.64134757	2994	21.65758315	3094	21.67295350	3194	21.68753024
2896	21.64168127	2996	21.65789878	3096	21.67325259	3196	21.68781413
2898	21.64201459	2998	21.65821407	3098	21.67355136	3198	21.68809773
2900	21.64234753	3000	21.65852901	3100	21.67384981	3200	21.68838104

TABLE 1 CAS TOTALEMENT IMAGINAIRE

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
3202	21.68866406	3302	21.70245506	3402	21.71557731	3502	21.72808134
3204	21.68894679	3304	21.70272388	3404	21.71583329	3504	21.72832544
3206	21.68922922	3306	21.70299243	3406	21.71608903	3506	21.72856930
3208	21.68951137	3308	21.70326072	3408	21.71634451	3508	21.72881294
3210	21.68979323	3310	21.70352874	3410	21.71659976	3510	21.72905635
3212	21.69007481	3312	21.70379650	3412	21.71685475	3512	21.72929953
3214	21.69035609	3314	21.70406399	3414	21.71710950	3514	21.72954249
3216	21.69063709	3316	21.70433122	3416	21.71736401	3516	21.72978521
3218	21.69091780	3318	21.70459818	3418	21.71761827	3518	21.73002772
3220	21.69119823	3320	21.70486488	3420	21.71787228	3520	21.73026999
3222	21.69147837	3322	21.70513131	3422	21.71812606	3522	21.73051204
3224	21.69175823	3324	21.70539748	3424	21.71837959	3524	21.73075386
3226	21.69203780	3326	21.70566339	3426	21.71863287	3526	21.73099546
3228	21.69231708	3328	21.70592904	3428	21.71888592	3528	21.73123683
3230	21.69259609	3330	21.70619442	3430	21.71913872	3530	21.73147798
3232	21.69287481	3332	21.70645955	3432	21.71939128	3532	21.73171891
3234	21.69315324	3334	21.70672441	3434	21.71964360	3534	21.73195961
3236	21.69343140	3336	21.70698901	3436	21.71989567	3536	21.73220008
3238	21.69370927	3338	21.70725335	3438	21.72014751	3538	21.73244034
3240	21.69398686	3340	21.70751743	3440	21.72039911	3540	21.73268037
3242	21.69426417	3342	21.70778126	3442	21.72065046	3542	21.73292018
3244	21.69454120	3344	21.70804482	3444	21.72090158	3544	21.73315976
3246	21.69481795	3346	21.70830813	3446	21.72115246	3546	21.73339913
3248	21.69509442	3348	21.70857117	3448	21.72140310	3548	21.73363827
3250	21.69537061	3350	21.70883396	3450	21.72165350	3550	21.73387719
3252	21.69564652	3352	21.70909649	3452	21.72190366	3552	21.73411589
3254	21.69592216	3354	21.70935877	3454	21.72215358	3554	21.73435437
3256	21.69619751	3356	21.70962079	3456	21.72240327	3556	21.73459263
3258	21.69647259	3358	21.70988255	3458	21.72265272	3558	21.73483067
3260	21.69674740	3360	21.71014405	3460	21.72290193	3560	21.73506849
3262	21.69702192	3362	21.71040531	3462	21.72315091	3562	21.73530609
3264	21.69729617	3364	21.71066630	3464	21.72339965	3564	21.73554347
3266	21.69757014	3366	21.71092704	3466	21.72364815	3566	21.73578063
3268	21.69784384	3368	21.71118753	3468	21.72389642	3568	21.73601758
3270	21.69811727	3370	21.71144776	3470	21.72414446	3570	21.73625430
3272	21.69839042	3372	21.71170774	3472	21.72439226	3572	21.73649091
3274	21.69866329	3374	21.71196747	3474	21.72463982	3574	21.73672711
3276	21.69893590	3376	21.71222695	3476	21.72488715	3576	21.73696318
3278	21.69920823	3378	21.71248617	3478	21.72513425	3578	21.73719904
3280	21.69948028	3380	21.71274514	3480	21.72538112	3580	21.73743468
3282	21.69975207	3382	21.71300386	3482	21.72562775	3582	21.73767010
3284	21.70002358	3384	21.71326233	3484	21.72587415	3584	21.73790531
3286	21.70029483	3386	21.71352055	3486	21.72612032	3586	21.73814031
3288	21.70056580	3388	21.71377851	3488	21.72636625	3588	21.73837509
3290	21.70083659	3390	21.71403623	3490	21.72661196	3590	21.73860965
3292	21.70110693	3392	21.71429370	3492	21.72685743	3592	21.73884400
3294	21.70137700	3394	21.71455092	3494	21.72710267	3594	21.73907814
3296	21.70164699	3396	21.71480789	3496	21.72734768	3596	21.73931206
3298	21.70191661	3398	21.71506461	3498	21.72759247	3598	21.73954577
3300	21.70218597	3400	21.71532109	3500	21.72783702	3600	21.73977926

TABLE 1 CAS TOTALEMENT IMAGINAIRE

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
3602	21.74001254	3702	21.75141185	3802	21.76231627	3902	21.77275937
3604	21.74024561	3704	21.75163467	3804	21.76252955	3904	21.77296374
3606	21.74047847	3706	21.75185729	3806	21.76274264	3906	21.77316794
3608	21.74071111	3708	21.75207972	3808	21.76295555	3908	21.77337197
3610	21.74094355	3710	21.75230195	3810	21.76316827	3910	21.77357582
3612	21.74117577	3712	21.75252398	3812	21.76338081	3912	21.77377951
3614	21.74140778	3714	21.75274582	3814	21.76359317	3914	21.77398302
3616	21.74163958	3716	21.75296746	3816	21.76380535	3916	21.77418636
3618	21.74187117	3718	21.75318890	3818	21.76401734	3918	21.77438954
3620	21.74210255	3720	21.75341015	3820	21.76422915	3920	21.77459254
3622	21.74233372	3722	21.75363120	3822	21.76444078	3922	21.77479537
3624	21.74256468	3724	21.75385206	3824	21.76465223	3924	21.77499803
3626	21.74279543	3726	21.75407272	3826	21.76486349	3926	21.77520052
3628	21.74302597	3728	21.75429319	3828	21.76507457	3928	21.77540284
3630	21.74325630	3730	21.75451347	3830	21.76528548	3930	21.77560500
3632	21.74348643	3732	21.75473355	3832	21.76549620	3932	21.77580698
3634	21.74371634	3734	21.75495343	3834	21.76570674	3934	21.77600879
3636	21.74394605	3736	21.75517313	3836	21.76591710	3936	21.77621044
3638	21.74417555	3738	21.75539263	3838	21.76612728	3938	21.77641192
3640	21.74440485	3740	21.75561194	3840	21.76633728	3940	21.77661323
3642	21.74463394	3742	21.75583105	3842	21.76654710	3942	21.77681437
3644	21.74486282	3744	21.75604997	3844	21.76675674	3944	21.77701534
3646	21.74509149	3746	21.75626870	3846	21.76696620	3946	21.77721615
3648	21.74531996	3748	21.75648724	3848	21.76717548	3948	21.77741679
3650	21.74554822	3750	21.75670559	3850	21.76738459	3950	21.77761726
3652	21.74577628	3752	21.75692375	3852	21.76759351	3952	21.77781757
3654	21.74600413	3754	21.75714171	3854	21.76780226	3954	21.77801771
3656	21.74623178	3756	21.75735949	3856	21.76801083	3956	21.77821768
3658	21.74645923	3758	21.75757707	3858	21.76821922	3958	21.77841749
3660	21.74668647	3760	21.75779446	3860	21.76842744	3960	21.77861713
3662	21.74691350	3762	21.75801167	3862	21.76863547	3962	21.77881660
3664	21.74714033	3764	21.75822868	3864	21.76884333	3964	21.77901591
3666	21.74736696	3766	21.75844551	3866	21.76905102	3966	21.77921506
3668	21.74759339	3768	21.75866214	3868	21.76925853	3968	21.77941404
3670	21.74781961	3770	21.75887859	3870	21.76946586	3970	21.77961285
3672	21.74804563	3772	21.75909485	3872	21.76967301	3972	21.77981150
3674	21.74827145	3774	21.75931092	3874	21.76987999	3974	21.78000999
3676	21.74849707	3776	21.75952680	3876	21.77008679	3976	21.78020831
3678	21.74872248	3778	21.75974249	3878	21.77029342	3978	21.78040647
3680	21.74894770	3780	21.75995800	3880	21.77049987	3980	21.78060446
3682	21.74917271	3782	21.76017332	3882	21.77070615	3982	21.78080229
3684	21.74939752	3784	21.76038845	3884	21.77091226	3984	21.78099996
3686	21.74962213	3786	21.76060340	3886	21.77111819	3986	21.78119747
3688	21.74984654	3788	21.76081816	3888	21.77132394	3988	21.78139481
3690	21.75007076	3790	21.76103273	3890	21.77152952	3990	21.78159199
3692	21.75029477	3792	21.76124712	3892	21.77173493	3992	21.78178900
3694	21.75051858	3794	21.76146132	3894	21.77194016	3994	21.78198586
3696	21.75074223	3796	21.76167533	3896	21.77214523	3996	21.78218255
3698	21.75096561	3798	21.76188916	3898	21.77235011	3998	21.78237908
3700	21.75118883	3800	21.76210281	3900	21.77255483	4000	21.78257545

TABLE 2 CAS TOTALEMENT REEL

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
1	.99797716	51	34.19864317	101	41.94390293	151	45.68272887
2	2.22342732	52	34.44052406	102	42.04299973	152	45.73888444
3	3.61083751	53	34.67671323	103	42.14075924	153	45.79450720
4	5.06708186	54	34.90742643	104	42.23721059	154	45.84960533
5	6.52353045	55	35.13286825	105	42.33238206	155	45.90418681
6	7.94143600	56	35.35323277	106	42.42630108	156	45.95825945
7	9.30172224	57	35.56870432	107	42.51899426	157	46.01183091
8	10.59647163	58	35.77945804	108	42.61048744	158	46.06490869
9	11.82381520	59	35.98566048	109	42.70080571	159	46.11750014
10	12.98507175	60	36.18747012	110	42.78997343	160	46.16961243
11	14.08316564	61	36.38503790	111	42.87801427	161	46.22125262
12	15.12175144	62	36.57850761	112	42.96495122	162	46.27242761
13	16.10473045	63	36.76801637	113	43.05080665	163	46.32314416
14	17.03598711	64	36.95369502	114	43.13560227	164	46.37340890
15	17.91924997	65	37.13566844	115	43.21935920	165	46.42322832
16	18.75802364	66	37.31405592	116	43.30209800	166	46.47260879
17	19.55556126	67	37.48897151	117	43.38383865	167	46.52155655
18	20.31485976	68	37.66052423	118	43.46469059	168	46.57007771
19	21.03866764	69	37.82881845	119	43.54440275	169	46.61817829
20	21.72949918	70	37.99395404	120	43.62326353	170	46.66586415
21	22.38965161	71	38.15602669	121	43.70120088	171	46.71314107
22	23.02122313	72	38.31512812	122	43.77823225	172	46.76001470
23	23.62613074	73	38.47134623	123	43.85437465	173	46.80649061
24	24.20612705	74	38.62476540	124	43.92964464	174	46.85257422
25	24.76281595	75	38.77546657	125	44.00405835	175	46.89827089
26	25.29766701	76	38.92352748	126	44.07763153	176	46.94358586
27	25.81202843	77	39.06902282	127	44.15037949	177	46.98852426
28	26.30713883	78	39.21202437	128	44.22231718	178	47.03309116
29	26.78413778	79	39.35260112	129	44.29345917	179	47.07729150
30	27.24407525	80	39.49041949	130	44.36381967	180	47.12113014
31	27.68792012	81	39.62674334	131	44.43341254	181	47.16461187
32	28.11656772	82	39.76043418	132	44.50225130	182	47.20774137
33	28.53084665	83	39.89195126	133	44.57034914	183	47.25052324
34	28.93152480	84	40.02135164	134	44.63771894	184	47.29296200
35	29.31931487	85	40.14869034	135	44.70437326	185	47.33506210
36	29.69487918	86	40.27402040	136	44.77032438	186	47.37682788
37	30.05883413	87	40.39739299	137	44.83558425	187	47.41826364
38	30.41175404	88	40.51845747	138	44.90016459	188	47.45937359
39	30.75417480	89	40.63846151	139	44.96407681	189	47.50016184
40	31.08659700	90	40.75625113	140	45.02733207	190	47.54063247
41	31.40948885	91	40.87227077	141	45.08994127	191	47.58078946
42	31.72328875	92	40.98655338	142	45.15191507	192	47.62063673
43	32.02840772	93	41.09917049	143	45.21326387	193	47.66017814
44	32.32523145	94	41.21013223	144	45.27399784	194	47.69941747
45	32.61412232	95	41.31948744	145	45.33412694	195	47.73835845
46	32.89542112	96	41.42727367	146	45.39366089	196	47.77700474
47	33.16944971	97	41.53352727	147	45.45260918	197	47.81535992
48	33.43650739	98	41.63822345	148	45.51098114	198	47.85342754
49	33.69688235	99	41.74157628	149	45.56878583	199	47.89121108
50	33.95084280	100	41.84343878	150	45.62603218	200	47.92871305

TABLE 2 CAS TOTALEMENT REEL

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
201	47.96593952	251	49.53448075	301	50.69200475	351	51.58851352
202	48.00289109	252	49.56099420	302	50.71213703	352	51.60442416
203	48.03957192	253	49.58734930	303	50.73216777	353	51.62026532
204	48.07598521	254	49.61354755	304	50.75209778	354	51.63603749
205	48.11213409	255	49.63959047	305	50.77192788	355	51.65174116
206	48.14802168	256	49.66547953	306	50.79165889	356	51.66737680
207	48.18365100	257	49.69121622	307	50.81129160	357	51.68294490
208	48.21902507	258	49.71680196	308	50.83082679	358	51.69844591
209	48.25414683	259	49.74223818	309	50.85026525	359	51.71388031
210	48.28901918	260	49.76752631	310	50.86960775	360	51.72924856
211	48.32364498	261	49.79266771	311	50.88885505	361	51.74455111
212	48.35802704	262	49.81766378	312	50.90800791	362	51.75978842
213	48.39216813	263	49.84251585	313	50.92706707	363	51.77496093
214	48.42607096	264	49.86722527	314	50.94603328	364	51.79006908
215	48.45973823	265	49.89179335	315	50.96490725	365	51.80511333
216	48.49317256	266	49.91622141	316	50.98368972	366	51.82009409
217	48.52637656	267	49.94051071	317	51.00238140	367	51.83501181
218	48.55935279	268	49.96466255	318	51.02098300	368	51.84986690
219	48.59210377	269	49.98867816	319	51.03949520	369	51.86465980
220	48.62463197	270	50.01255879	320	51.05791872	370	51.87939093
221	48.65693984	271	50.03630566	321	51.07625423	371	51.89406069
222	48.68902979	272	50.05991997	322	51.09450240	372	51.90866949
223	48.72090418	273	50.08340293	323	51.11266391	373	51.92321776
224	48.75256536	274	50.10675570	324	51.13073943	374	51.93770589
225	48.78401561	275	50.12997945	325	51.14872960	375	51.95213427
226	48.81525721	276	50.15307532	326	51.16663507	376	51.96650332
227	48.84629239	277	50.17604446	327	51.18445650	377	51.98081342
228	48.87712334	278	50.19888799	328	51.20219450	378	51.99506495
229	48.90775224	279	50.22160700	329	51.21984972	379	52.00925831
230	48.93818122	280	50.24420259	330	51.23742277	380	52.02339388
231	48.96841237	281	50.26667585	331	51.25491428	381	52.03747204
232	48.99844778	282	50.28902784	332	51.27232484	382	52.05149315
233	49.02828949	283	50.31125961	333	51.28965507	383	52.06545760
234	49.05793951	284	50.33337221	334	51.30690555	384	52.07936576
235	49.08739983	285	50.35536667	335	51.32407689	385	52.09321798
236	49.11667240	286	50.37724400	336	51.34116966	386	52.10701463
237	49.14575915	287	50.39900520	337	51.35818444	387	52.12075607
238	49.17466198	288	50.42065128	338	51.37512181	388	52.13444266
239	49.20338277	289	50.44218321	339	51.39198234	389	52.14807474
240	49.23192337	290	50.46360196	340	51.40876658	390	52.16165267
241	49.26028560	291	50.48490849	341	51.42547509	391	52.17517679
242	49.28847125	292	50.50610375	342	51.44210843	392	52.18864745
243	49.31648210	293	50.52718867	343	51.45866713	393	52.20206498
244	49.34431990	294	50.54816418	344	51.47515174	394	52.21542972
245	49.37198636	295	50.56903119	345	51.49156278	395	52.22874202
246	49.39948319	296	50.58979061	346	51.50790080	396	52.24200219
247	49.42681207	297	50.61044333	347	51.52416630	397	52.25521057
248	49.45397464	298	50.63099024	348	51.54035982	398	52.26836748
249	49.48097254	299	50.65143221	349	51.55648185	399	52.28147325
250	49.50780738	300	50.67177009	350	51.57253292	400	52.29452820

TABLE 2 CAS TOTALEMENT REEL

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
401	52.30753263	451	52.89964702	501	53.39746594	551	53.82305225
402	52.32048688	452	52.91044004	502	53.40662499	552	53.83094207
403	52.33339124	453	52.92119588	503	53.41575550	553	53.83880944
404	52.34624604	454	52.93191476	504	53.42485761	554	53.84665446
405	52.35905156	455	52.94259688	505	53.43393148	555	53.85447725
406	52.37180813	456	52.95324244	506	53.44297723	556	53.86227790
407	52.38451604	457	52.96385164	507	53.45199501	557	53.87005651
408	52.39717558	458	52.97442468	508	53.46098495	558	53.87781318
409	52.40978706	459	52.98496176	509	53.46994720	559	53.88554801
410	52.42235077	460	52.99546308	510	53.47888190	560	53.89326110
411	52.43486700	461	53.00592882	511	53.48778917	561	53.90095255
412	52.44733604	462	53.01635920	512	53.49666916	562	53.90862245
413	52.45975817	463	53.02675439	513	53.50552200	563	53.91627091
414	52.47213368	464	53.03711459	514	53.51434782	564	53.92389801
415	52.48446285	465	53.04743999	515	53.52314675	565	53.93150386
416	52.49674597	466	53.05773077	516	53.53191893	566	53.93908855
417	52.50898330	467	53.06798713	517	53.54066449	567	53.94665218
418	52.52117512	468	53.07820925	518	53.54938356	568	53.95419483
419	52.53332170	469	53.08839731	519	53.55807627	569	53.96171661
420	52.54542332	470	53.09855149	520	53.56674273	570	53.96921760
421	52.55748024	471	53.10867198	521	53.57538310	571	53.97669790
422	52.56949273	472	53.11875896	522	53.58399747	572	53.98415760
423	52.58146105	473	53.12881260	523	53.59258600	573	53.99159679
424	52.59338546	474	53.13883308	524	53.60114879	574	53.99901556
425	52.60526622	475	53.14882058	525	53.60968598	575	54.00641400
426	52.61710359	476	53.15877527	526	53.61819768	576	54.01379220
427	52.62889782	477	53.16869733	527	53.62668402	577	54.02115025
428	52.64064918	478	53.17858693	528	53.63514513	578	54.02848825
429	52.65235790	479	53.18844423	529	53.64358111	579	54.03580626
430	52.66402423	480	53.19826941	530	53.65199209	580	54.04310440
431	52.67564843	481	53.20806264	531	53.66037820	581	54.05038273
432	52.68723074	482	53.21782409	532	53.66873954	582	54.05764135
433	52.69877140	483	53.22755391	533	53.67707624	583	54.06488034
434	52.71027065	484	53.23725228	534	53.68538841	584	54.07209979
435	52.72172873	485	53.24691935	535	53.69367617	585	54.07929979
436	52.73314588	486	53.25655530	536	53.70193963	586	54.08648041
437	52.74452233	487	53.26616028	537	53.71017891	587	54.09364174
438	52.75585832	488	53.27573445	538	53.71839413	588	54.10078387
439	52.76715408	489	53.28527797	539	53.72658539	589	54.10790687
440	52.77840084	490	53.29479100	540	53.73475281	590	54.11501084
441	52.78962583	491	53.30427369	541	53.74289650	591	54.12209584
442	52.80080226	492	53.31372621	542	53.75101657	592	54.12916197
443	52.81193938	493	53.32314870	543	53.75911312	593	54.13620931
444	52.82303739	494	53.33254132	544	53.76718628	594	54.14323792
445	52.83409653	495	53.34190423	545	53.77523615	595	54.15024790
446	52.84511701	496	53.35122756	546	53.78326284	596	54.15723933
447	52.85609903	497	53.36054148	547	53.79126645	597	54.16421227
448	52.86704284	498	53.36981613	548	53.79924709	598	54.17116682
449	52.87794863	499	53.37906166	549	53.80720486	599	54.17810305
450	52.88881662	500	53.38827821	550	53.81513988	600	54.18502103

TABLE 2 CAS TOTALEMENT REEL

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
601	54.19192085	651	54.51533199	701	54.80167589	751	55.05734510
602	54.19880258	652	54.52139799	702	54.80707130	752	55.06218166
603	54.20566629	653	54.52744929	703	54.81245452	753	55.06700801
604	54.21251207	654	54.53348594	704	54.81782561	754	55.07182418
605	54.21933998	655	54.53950800	705	54.82318461	755	55.07663020
606	54.22615011	656	54.54551553	706	54.82853157	756	55.08142612
607	54.23294253	657	54.55150858	707	54.83386652	757	55.08621195
608	54.23971730	658	54.55748721	708	54.83918951	758	55.09098774
609	54.24647452	659	54.56345147	709	54.84450058	759	55.09575352
610	54.25321424	660	54.56940143	710	54.84979978	760	55.10050933
611	54.25993654	661	54.57533713	711	54.85508715	761	55.10525520
612	54.26664149	662	54.58125863	712	54.86036273	762	55.10999115
613	54.27332917	663	54.58716599	713	54.86562656	763	55.11471723
614	54.27999965	664	54.59305925	714	54.87087869	764	55.11943347
615	54.28665299	665	54.59893849	715	54.87611915	765	55.12413990
616	54.29328928	666	54.60480373	716	54.88134800	766	55.12883655
617	54.29990857	667	54.61065505	717	54.88656526	767	55.13352346
618	54.30651094	668	54.61649250	718	54.89177099	768	55.13820065
619	54.31309646	669	54.62231612	719	54.89696521	769	55.14286817
620	54.31966520	670	54.62812597	720	54.90214799	770	55.14752604
621	54.32621723	671	54.63392210	721	54.90731934	771	55.15217429
622	54.33275261	672	54.63970456	722	54.91247932	772	55.15681297
623	54.33927141	673	54.64547341	723	54.91762796	773	55.16144209
624	54.34577370	674	54.65122870	724	54.92276531	774	55.16606169
625	54.35225955	675	54.65697048	725	54.92789141	775	55.17067180
626	54.35872903	676	54.66269879	726	54.93300628	776	55.17527246
627	54.36518220	677	54.66841370	727	54.93810998	777	55.17986369
628	54.37161912	678	54.67411525	728	54.94320255	778	55.18444552
629	54.37803987	679	54.67980348	729	54.94828401	779	55.18901799
630	54.38444450	680	54.68547846	730	54.95335442	780	55.19358113
631	54.39083309	681	54.69114023	731	54.95841380	781	55.19813497
632	54.39720569	682	54.69678884	732	54.96346220	782	55.20267953
633	54.40356238	683	54.70242434	733	54.96849966	783	55.20721485
634	54.40990322	684	54.70804678	734	54.97352621	784	55.21174096
635	54.41622826	685	54.71365620	735	54.97854190	785	55.21625789
636	54.42253758	686	54.71925266	736	54.98354675	786	55.22076567
637	54.42883123	687	54.72483620	737	54.98854082	787	55.22526432
638	54.43510928	688	54.73040687	738	54.99352412	788	55.22975388
639	54.44137179	689	54.73596472	739	54.99849671	789	55.23423439
640	54.44761882	690	54.74150979	740	55.00345862	790	55.23870585
641	54.45385044	691	54.74704214	741	55.00840989	791	55.24316832
642	54.46006670	692	54.75256182	742	55.01335054	792	55.24762181
643	54.46626766	693	54.75806885	743	55.01828063	793	55.25206635
644	54.47245340	694	54.76356330	744	55.02320018	794	55.25650198
645	54.47862396	695	54.76904521	745	55.02810923	795	55.26092871
646	54.48477949	696	54.77451463	746	55.03300783	796	55.26534659
647	54.49091979	697	54.77997160	747	55.03789599	797	55.26975564
648	54.49704519	698	54.78541616	748	55.04277377	798	55.27415588
649	54.50315565	699	54.79084837	749	55.04764118	799	55.27854735
650	54.50925123	700	54.79626827	750	55.05249828	800	55.28293008

TABLE 2 CAS TOTALEMENT REEL

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
801	55.28730408	851	55.49547274	901	55.68499146	951	55.85840857
802	55.29166940	852	55.49943653	902	55.68860995	952	55.86172770
803	55.29602605	853	55.50339289	903	55.69222203	953	55.86504126
804	55.30037407	854	55.50734186	904	55.69582773	954	55.86834925
805	55.30471348	855	55.51128345	905	55.69942705	955	55.87165169
806	55.30904431	856	55.51521769	906	55.70307002	956	55.87494860
807	55.31336658	857	55.51914460	907	55.70660666	957	55.87823999
808	55.31768033	858	55.52306421	908	55.71018698	958	55.88152589
809	55.32198559	859	55.52697653	909	55.71376100	959	55.88480629
810	55.32628237	860	55.53088158	910	55.71732874	960	55.88808122
811	55.33057070	861	55.53477940	911	55.72089022	961	55.89135069
812	55.33485062	862	55.53866999	912	55.72444545	962	55.89461472
813	55.33912214	863	55.54255338	913	55.72799445	963	55.89787332
814	55.34338530	864	55.54642960	914	55.73153724	964	55.90112651
815	55.34764012	865	55.55029866	915	55.73507384	965	55.90437430
816	55.35188663	866	55.55416058	916	55.73860426	966	55.90761670
817	55.35612485	867	55.55801539	917	55.74212852	967	55.91085372
818	55.36035480	868	55.56186311	918	55.74564665	968	55.91408540
819	55.36457653	869	55.56570375	919	55.74915865	969	55.91731172
820	55.36879004	870	55.56953734	920	55.75266454	970	55.92053273
821	55.37299537	871	55.57336391	921	55.75616434	971	55.92374841
822	55.37719255	872	55.57718346	922	55.75965807	972	55.92695880
823	55.38138159	873	55.58099603	923	55.76314574	973	55.93016389
824	55.38556252	874	55.58480162	924	55.76662737	974	55.93336372
825	55.38973537	875	55.58860027	925	55.77010298	975	55.93655829
826	55.39390016	876	55.59239199	926	55.77357259	976	55.93974761
827	55.39805692	877	55.59617680	927	55.77703621	977	55.94293171
828	55.40220568	878	55.59995473	928	55.78049385	978	55.94611058
829	55.40634645	879	55.60372579	929	55.78394554	979	55.94928425
830	55.41047927	880	55.60749000	930	55.78739129	980	55.95245274
831	55.41460415	881	55.61124738	931	55.79083112	981	55.95561604
832	55.41872112	882	55.61499796	932	55.79426504	982	55.95877419
833	55.42283021	883	55.61874175	933	55.79769307	983	55.96192718
834	55.42693144	884	55.62247877	934	55.80111522	984	55.96507504
835	55.43102483	885	55.62620905	935	55.80453152	985	55.96821778
836	55.43511041	886	55.62993259	936	55.80794198	986	55.97135541
837	55.43918820	887	55.63364943	937	55.81134661	987	55.97448794
838	55.44325823	888	55.63735958	938	55.81474543	988	55.97761540
839	55.44732052	889	55.64106306	939	55.81813845	989	55.98073778
840	55.45137509	890	55.64475988	940	55.82152570	990	55.98385511
841	55.45542197	891	55.64845008	941	55.82490719	991	55.98696740
842	55.45946118	892	55.65213366	942	55.82828293	992	55.99007465
843	55.46349274	893	55.65581065	943	55.83165294	993	55.99317689
844	55.46751668	894	55.65948106	944	55.83501723	994	55.99627413
845	55.47153302	895	55.66314492	945	55.83837583	995	55.99936638
846	55.47554178	896	55.66680225	946	55.84172874	996	56.00245365
847	55.47954299	897	55.67045305	947	55.84507598	997	56.00553595
848	55.48353667	898	55.67409735	948	55.84841757	998	56.00861331
849	55.48752284	899	55.67773518	949	55.85175352	999	56.01168572
850	55.49150152	900	55.68136654	950	55.85508385	1000	56.01475321

TABLE 2 CAS TOTALEMENT REEL

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
1001	56.01781578	1051	56.16494758	1101	56.30125558	1151	56.42796483
1002	56.02087346	1052	56.16777539	1102	56.30383009	1152	56.43040853
1003	56.02392624	1053	56.17059889	1103	56.30650077	1153	56.43284882
1004	56.02697415	1054	56.17341809	1104	56.30911763	1154	56.43528571
1005	56.03001720	1055	56.17623300	1105	56.31173069	1155	56.43771921
1006	56.03305540	1056	56.17904362	1106	56.31433995	1156	56.44014932
1007	56.03608876	1057	56.18184998	1107	56.31694542	1157	56.44257605
1008	56.03911729	1058	56.18465208	1108	56.31954711	1158	56.44499941
1009	56.04214101	1059	56.18744993	1109	56.32214503	1159	56.44741940
1010	56.04515992	1060	56.19024354	1110	56.32473919	1160	56.44983603
1011	56.04817405	1061	56.19303293	1111	56.32732959	1161	56.45224932
1012	56.05118340	1062	56.19581810	1112	56.32991625	1162	56.45465926
1013	56.05418799	1063	56.19859905	1113	56.33249918	1163	56.45706587
1014	56.05718783	1064	56.20137582	1114	56.33507837	1164	56.45946915
1015	56.06018292	1065	56.20414839	1115	56.33765385	1165	56.46186911
1016	56.06317328	1066	56.20691679	1116	56.34022561	1166	56.46426576
1017	56.06615893	1067	56.20968102	1117	56.34279368	1167	56.46665910
1018	56.06913988	1068	56.21244109	1118	56.34535805	1168	56.46904914
1019	56.072111613	1069	56.21519702	1119	56.34791873	1169	56.47143590
1020	56.07508770	1070	56.21794881	1120	56.35047574	1170	56.47381937
1021	56.07805460	1071	56.22069648	1121	56.35302909	1171	56.47619956
1022	56.08101685	1072	56.22344002	1122	56.35557877	1172	56.47857649
1023	56.08397445	1073	56.22617946	1123	56.35812480	1173	56.48095015
1024	56.08692741	1074	56.22891481	1124	56.36066719	1174	56.48332056
1025	56.08987575	1075	56.23164606	1125	56.36320595	1175	56.48568772
1026	56.09281949	1076	56.23437324	1126	56.36574108	1176	56.48805164
1027	56.09575862	1077	56.23709635	1127	56.36827259	1177	56.49041233
1028	56.09869317	1078	56.23981541	1128	56.37080049	1178	56.49276979
1029	56.10162314	1079	56.24253041	1129	56.37332480	1179	56.49512403
1030	56.10454855	1080	56.24524138	1130	56.37584551	1180	56.49747507
1031	56.10746940	1081	56.24794831	1131	56.37836263	1181	56.49982289
1032	56.11038571	1082	56.25065123	1132	56.38087618	1182	56.50216752
1033	56.11329749	1083	56.25335014	1133	56.38338616	1183	56.50450826
1034	56.11620475	1084	56.25604505	1134	56.38589258	1184	56.50684721
1035	56.11910751	1085	56.25873597	1135	56.38839545	1185	56.50918229
1036	56.12200577	1086	56.26142290	1136	56.39089478	1186	56.51151419
1037	56.12489954	1087	56.26410587	1137	56.39339057	1187	56.51384204
1038	56.12778884	1088	56.26678487	1138	56.39588283	1188	56.51616852
1039	56.13067368	1089	56.26946992	1139	56.39837157	1189	56.51849096
1040	56.13355406	1090	56.27215103	1140	56.40085680	1190	56.52081026
1041	56.13643000	1091	56.27479820	1141	56.40333853	1191	56.52312642
1042	56.13930152	1092	56.27746145	1142	56.40581676	1192	56.52543945
1043	56.14216861	1093	56.28012078	1143	56.40829150	1193	56.52774936
1044	56.14503130	1094	56.28277621	1144	56.41076277	1194	56.53005615
1045	56.14788958	1095	56.28542774	1145	56.41323056	1195	56.53235983
1046	56.15074349	1096	56.28807538	1146	56.41569489	1196	56.53466042
1047	56.15359301	1097	56.29071914	1147	56.41815576	1197	56.53695790
1048	56.15643818	1098	56.29335903	1148	56.42061318	1198	56.53925230
1049	56.15927898	1099	56.29599506	1149	56.42306716	1199	56.54154362
1050	56.16211545	1100	56.29862724	1150	56.42551770	1200	56.54383186

TABLE 2 CAS TOTALEMENT REEL

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
1201	56.54611704	1251	56.65660421	1301	56.76019500	1351	56.85755572
1202	56.54839915	1252	56.65874123	1302	56.76220121	1352	56.85944351
1203	56.55067820	1253	56.66087550	1303	56.76420493	1353	56.86132904
1204	56.55295421	1254	56.66300703	1304	56.76620617	1354	56.86321232
1205	56.55522718	1255	56.66513583	1305	56.76820493	1355	56.86509336
1206	56.55749711	1256	56.66726189	1306	56.77020123	1356	56.86697216
1207	56.55976401	1257	56.66938522	1307	56.77219506	1357	56.86884872
1208	56.56202789	1258	56.67150583	1308	56.77418643	1358	56.87072305
1209	56.56428875	1259	56.67362373	1309	56.77617535	1359	56.87259516
1210	56.56654660	1260	56.67573891	1310	56.77816181	1360	56.87446504
1211	56.56880145	1261	56.67785140	1311	56.78014583	1361	56.87633270
1212	56.57105330	1262	56.67996118	1312	56.78212741	1362	56.87819815
1213	56.57330216	1263	56.68206827	1313	56.78410656	1363	56.88006138
1214	56.57554904	1264	56.68417267	1314	56.78608328	1364	56.88192241
1215	56.57779093	1265	56.68627439	1315	56.78805756	1365	56.88378124
1216	56.58003086	1266	56.68837343	1316	56.79002943	1366	56.88563787
1217	56.58226782	1267	56.69046980	1317	56.79199888	1367	56.88749231
1218	56.58450183	1268	56.69256351	1318	56.79396592	1368	56.88934456
1219	56.58673288	1269	56.69465455	1319	56.79593056	1369	56.89119462
1220	56.58896098	1270	56.69674294	1320	56.79789279	1370	56.89304250
1221	56.59118615	1271	56.69882868	1321	56.79985262	1371	56.89488821
1222	56.59340838	1272	56.70091178	1322	56.80181006	1372	56.89673174
1223	56.59562768	1273	56.70299223	1323	56.80376512	1373	56.89857310
1224	56.59784406	1274	56.70507006	1324	56.80571779	1374	56.90041230
1225	56.60005753	1275	56.70714525	1325	56.80766808	1375	56.90224934
1226	56.60226809	1276	56.70921782	1326	56.80961600	1376	56.90408422
1227	56.60447574	1277	56.71128778	1327	56.81156154	1377	56.90591694
1228	56.60668050	1278	56.71335512	1328	56.81350473	1378	56.90774752
1229	56.60888237	1279	56.71541985	1329	56.81544555	1379	56.90957596
1230	56.61108135	1280	56.71748199	1330	56.81738402	1380	56.91140225
1231	56.61327745	1281	56.71954153	1331	56.81932013	1381	56.91322641
1232	56.61547068	1282	56.72159847	1332	56.82125390	1382	56.91504844
1233	56.61766105	1283	56.72365283	1333	56.82318533	1383	56.91686833
1234	56.61984855	1284	56.72570461	1334	56.82511442	1384	56.91868611
1235	56.62203320	1285	56.72775382	1335	56.82704118	1385	56.92050176
1236	56.62421500	1286	56.72980045	1336	56.82896561	1386	56.92231530
1237	56.62639396	1287	56.73184452	1337	56.83088772	1387	56.92412672
1238	56.62857008	1288	56.73388603	1338	56.83280750	1388	56.92593603
1239	56.63074337	1289	56.73592498	1339	56.83472498	1389	56.92774325
1240	56.63291384	1290	56.73796138	1340	56.83664014	1390	56.92954836
1241	56.63508149	1291	56.73999524	1341	56.83855300	1391	56.93135137
1242	56.63724632	1292	56.74202656	1342	56.84046355	1392	56.93315229
1243	56.63940835	1293	56.74405535	1343	56.84237181	1393	56.93495112
1244	56.64156757	1294	56.74608161	1344	56.84427778	1394	56.93674787
1245	56.64372400	1295	56.74810534	1345	56.84618145	1395	56.93854253
1246	56.64587764	1296	56.75012655	1346	56.84808285	1396	56.94033512
1247	56.64802850	1297	56.75214525	1347	56.84998196	1397	56.94212563
1248	56.65017658	1298	56.75416144	1348	56.85187880	1398	56.94391408
1249	56.65232189	1299	56.75617513	1349	56.85377337	1399	56.94570046
1250	56.65446443	1300	56.75818631	1350	56.85566568	1400	56.94748478

TABLE 2 CAS TOTALEMENT REEL

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
1401	56.94926704	1451	57.03583757	1501	57.11771490	1551	57.19529463
1402	56.95104724	1452	57.03751971	1502	57.11930738	1552	57.19680486
1403	56.95282540	1453	57.03919998	1503	57.12089813	1553	57.19831353
1404	56.95460150	1454	57.04087838	1504	57.12248718	1554	57.19982062
1405	56.95637557	1455	57.04255492	1505	57.12407452	1555	57.20132614
1406	56.95814759	1456	57.04422959	1506	57.12566015	1556	57.20283010
1407	56.95991758	1457	57.04590240	1507	57.12724408	1557	57.20433249
1408	56.96168554	1458	57.04757336	1508	57.12882631	1558	57.20583332
1409	56.96345147	1459	57.04924247	1509	57.13040684	1559	57.20733259
1410	56.96521538	1460	57.05090972	1510	57.13198568	1560	57.20883030
1411	56.96697727	1461	57.05257514	1511	57.13356283	1561	57.21032646
1412	56.96873714	1462	57.05423871	1512	57.13513828	1562	57.21182107
1413	56.97049499	1463	57.05590044	1513	57.13671206	1563	57.21331413
1414	56.97225084	1464	57.05756033	1514	57.13828415	1564	57.21480544
1415	56.97400468	1465	57.05921839	1515	57.13985456	1565	57.21629561
1416	56.97575652	1466	57.06087462	1516	57.14142330	1566	57.21778404
1417	56.97750636	1467	57.06252903	1517	57.14299036	1567	57.21927094
1418	56.97925421	1468	57.06418161	1518	57.14455575	1568	57.22075629
1419	56.98100006	1469	57.06583238	1519	57.14611947	1569	57.22224011
1420	56.98274393	1470	57.06748132	1520	57.14768153	1570	57.22372240
1421	56.98448582	1471	57.06912846	1521	57.14924192	1571	57.22520317
1422	56.98622572	1472	57.07077378	1522	57.15080066	1572	57.22668241
1423	56.98796365	1473	57.07241730	1523	57.15235774	1573	57.22816012
1424	56.98969960	1474	57.07405901	1524	57.15391316	1574	57.22963631
1425	56.99143359	1475	57.07569892	1525	57.15546694	1575	57.23111099
1426	56.99316561	1476	57.07733704	1526	57.15701906	1576	57.23258415
1427	56.99489567	1477	57.07897336	1527	57.15856954	1577	57.23405580
1428	56.99662377	1478	57.08060789	1528	57.16011838	1578	57.23552593
1429	56.99834991	1479	57.08224063	1529	57.16166558	1579	57.23699456
1430	57.00007411	1480	57.08387159	1530	57.16321114	1580	57.23846168
1431	57.00179635	1481	57.08550077	1531	57.16475506	1581	57.23992730
1432	57.00351665	1482	57.08712816	1532	57.16629736	1582	57.24139142
1433	57.00523501	1483	57.08875379	1533	57.16783803	1583	57.24285404
1434	57.00695143	1484	57.09037764	1534	57.16937707	1584	57.24431517
1435	57.00866592	1485	57.09199972	1535	57.17091448	1585	57.24577480
1436	57.01037848	1486	57.09362003	1536	57.17245028	1586	57.24723204
1437	57.01208911	1487	57.09523858	1537	57.17398446	1587	57.24868959
1438	57.01379782	1488	57.09685537	1538	57.17551702	1588	57.25014476
1439	57.01550461	1489	57.09847041	1539	57.17704797	1589	57.25159844
1440	57.01720048	1490	57.10008369	1540	57.17857732	1590	57.25305064
1441	57.01891244	1491	57.10169522	1541	57.18010505	1591	57.25450136
1442	57.02061349	1492	57.10330500	1542	57.18163118	1592	57.25595061
1443	57.02231263	1493	57.10491304	1543	57.18315571	1593	57.25739838
1444	57.02400087	1494	57.10651934	1544	57.18467865	1594	57.25884468
1445	57.02570522	1495	57.10812390	1545	57.18619998	1595	57.26028951
1446	57.02739866	1496	57.10972672	1546	57.18771972	1596	57.26173288
1447	57.02909021	1497	57.11132781	1547	57.18923787	1597	57.26317478
1448	57.03077989	1498	57.11292717	1548	57.19075444	1598	57.26461522
1449	57.03246764	1499	57.11452480	1549	57.19226942	1599	57.26605420
1450	57.03415355	1500	57.11612071	1550	57.19378281	1600	57.26749172

TABLE 2 CAS TOTALEMENT REEL

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
1601	57.26892779	1651	57.33892711	1701	57.40557215	1751	57.46911368
1602	57.27036240	1652	57.34029200	1702	57.40687260	1752	57.47035444
1603	57.27179557	1653	57.34165555	1703	57.40817182	1753	57.47159405
1604	57.27322729	1654	57.34301777	1704	57.40946980	1754	57.47283252
1605	57.27465756	1655	57.34437865	1705	57.41076654	1755	57.47406984
1606	57.27608639	1656	57.34573820	1706	57.41206205	1756	57.47530602
1607	57.27751377	1657	57.34709642	1707	57.41335633	1757	57.47654106
1608	57.27893972	1658	57.34845332	1708	57.41464938	1758	57.47777496
1609	57.28036424	1659	57.34980888	1709	57.41594120	1759	57.47900771
1610	57.28178732	1660	57.35116312	1710	57.41723180	1760	57.48023934
1611	57.28320897	1661	57.35251604	1711	57.41852117	1761	57.48146982
1612	57.28462919	1662	57.35386764	1712	57.41980933	1762	57.48269917
1613	57.28604798	1663	57.35521793	1713	57.42109626	1763	57.48392739
1614	57.28746535	1664	57.35656689	1714	57.42238197	1764	57.48515449
1615	57.28888129	1665	57.35791455	1715	57.42366647	1765	57.48638045
1616	57.29029582	1666	57.35926089	1716	57.42494975	1766	57.48760528
1617	57.29170893	1667	57.36060592	1717	57.42623182	1767	57.48882899
1618	57.29312062	1668	57.36194964	1718	57.42751268	1768	57.49005158
1619	57.29453099	1669	57.36329206	1719	57.42879234	1769	57.49127305
1620	57.29593977	1670	57.36463318	1720	57.43007078	1770	57.49249339
1621	57.29734723	1671	57.36597299	1721	57.43134802	1771	57.49371262
1622	57.29875328	1672	57.36731151	1722	57.43262405	1772	57.49493073
1623	57.30015793	1673	57.36864872	1723	57.43389889	1773	57.49614772
1624	57.30156118	1674	57.36998465	1724	57.43517252	1774	57.49736360
1625	57.30296303	1675	57.37131927	1725	57.43644496	1775	57.49857837
1626	57.30436348	1676	57.37265261	1726	57.43771620	1776	57.49979203
1627	57.30576254	1677	57.37398466	1727	57.43898625	1777	57.50100458
1628	57.30716020	1678	57.37531542	1728	57.44025510	1778	57.50221602
1629	57.30855648	1679	57.37664490	1729	57.44152276	1779	57.50342636
1630	57.30995136	1680	57.37797309	1730	57.44278924	1780	57.50463559
1631	57.31134486	1681	57.37930000	1731	57.44405452	1781	57.50584372
1632	57.31273698	1682	57.38062563	1732	57.44531862	1782	57.50705075
1633	57.31412771	1683	57.38194998	1733	57.44658154	1783	57.50825668
1634	57.31551706	1684	57.38327306	1734	57.44784328	1784	57.50946152
1635	57.31690504	1685	57.38459487	1735	57.44910383	1785	57.51066525
1636	57.31829164	1686	57.38591540	1736	57.45036321	1786	57.51186790
1637	57.31967687	1687	57.38723456	1737	57.45162141	1787	57.51306945
1638	57.32106072	1688	57.38855266	1738	57.45287844	1788	57.51426991
1639	57.32244321	1689	57.38986939	1739	57.45413429	1789	57.51546928
1640	57.32382433	1690	57.39118486	1740	57.45538897	1790	57.51666756
1641	57.32520409	1691	57.39249906	1741	57.45664249	1791	57.51786476
1642	57.32658249	1692	57.39381201	1742	57.45789483	1792	57.51906087
1643	57.32795952	1693	57.39512370	1743	57.45914601	1793	57.52025500
1644	57.32933520	1694	57.39643413	1744	57.46039602	1794	57.52144925
1645	57.33071052	1695	57.39774331	1745	57.46164488	1795	57.52264272
1646	57.33208549	1696	57.39905123	1746	57.46289257	1796	57.52383451
1647	57.33345911	1697	57.40035791	1747	57.46413910	1797	57.52502522
1648	57.33483243	1698	57.40166334	1748	57.46538448	1798	57.52621496
1649	57.33619535	1699	57.40296752	1749	57.46662870	1799	57.52740342
1650	57.33755687	1700	57.40427045	1750	57.46787176	1800	57.52859091

TABLE 2 CAS TOTALEMENT REEL

N	MINORATION	N	MINORATION	N	MINORATION	N	MINORATION
1801	57.52977733	1851	57.58776676	1901	57.64326626	1951	57.69644308
1802	57.53096268	1852	57.58890056	1902	57.64435202	1952	57.69748399
1803	57.53214697	1853	57.59003338	1903	57.64543686	1953	57.69852404
1804	57.53333018	1854	57.59116520	1904	57.64652078	1954	57.69956322
1805	57.53451234	1855	57.59229603	1905	57.64760377	1955	57.70060154
1806	57.53569343	1856	57.59342587	1906	57.64868584	1956	57.70163899
1807	57.53687346	1857	57.59455472	1907	57.64976698	1957	57.70267558
1808	57.53805243	1858	57.59568258	1908	57.65084720	1958	57.70371132
1809	57.53923034	1859	57.59680946	1909	57.65192651	1959	57.70474619
1810	57.54040719	1860	57.59793535	1910	57.65300489	1960	57.70578020
1811	57.54158299	1861	57.59906027	1911	57.65408236	1961	57.70681336
1812	57.54275774	1862	57.60018420	1912	57.65515891	1962	57.70784566
1813	57.54393143	1863	57.60130714	1913	57.65623455	1963	57.70887710
1814	57.54510408	1864	57.60242912	1914	57.65730927	1964	57.70990769
1815	57.54627567	1865	57.60355011	1915	57.65838308	1965	57.71093743
1816	57.54744621	1866	57.60467013	1916	57.65945598	1966	57.71196631
1817	57.54861571	1867	57.60578917	1917	57.66052798	1967	57.71299435
1818	57.54978417	1868	57.60690724	1918	57.66159906	1968	57.71402153
1819	57.55095158	1869	57.60802434	1919	57.66266923	1969	57.71504787
1820	57.55211795	1870	57.60914046	1920	57.66373850	1970	57.71607336
1821	57.55328328	1871	57.61025562	1921	57.66480687	1971	57.71709801
1822	57.55444757	1872	57.61136981	1922	57.66587433	1972	57.71812181
1823	57.55561083	1873	57.61248303	1923	57.66694089	1973	57.71914476
1824	57.55677304	1874	57.61359529	1924	57.66800654	1974	57.72016687
1825	57.55793423	1875	57.61470659	1925	57.66907130	1975	57.72118814
1826	57.55909438	1876	57.61581692	1926	57.67013516	1976	57.72220857
1827	57.56025350	1877	57.61692629	1927	57.67119812	1977	57.72322817
1828	57.56141159	1878	57.61803470	1928	57.67226019	1978	57.72424692
1829	57.56256865	1879	57.61914215	1929	57.67332136	1979	57.72526483
1830	57.56372468	1880	57.62024865	1930	57.67438163	1980	57.72628191
1831	57.56487969	1881	57.62135418	1931	57.67544101	1981	57.72729816
1832	57.56603368	1882	57.62245877	1932	57.67649951	1982	57.72831357
1833	57.56718664	1883	57.62356240	1933	57.67755711	1983	57.72932815
1834	57.56833858	1884	57.62466508	1934	57.67861382	1984	57.73034149
1835	57.56948950	1885	57.62576681	1935	57.67966965	1985	57.73135481
1836	57.57063941	1886	57.62686759	1936	57.68072459	1986	57.73236689
1837	57.57178829	1887	57.62796742	1937	57.68177864	1987	57.73337815
1838	57.57293617	1888	57.62906630	1938	57.68283181	1988	57.73438858
1839	57.57408302	1889	57.63016424	1939	57.68388409	1989	57.73539818
1840	57.57522887	1890	57.63126124	1940	57.68493550	1990	57.73640696
1841	57.57637370	1891	57.63235729	1941	57.68598602	1991	57.73741492
1842	57.57751753	1892	57.63345240	1942	57.68703566	1992	57.73842205
1843	57.57866034	1893	57.63454658	1943	57.68808443	1993	57.73942836
1844	57.57980215	1894	57.63563981	1944	57.68913232	1994	57.74043385
1845	57.58094296	1895	57.63673210	1945	57.69017933	1995	57.74143852
1846	57.58208276	1896	57.63782346	1946	57.69122547	1996	57.74244237
1847	57.58322156	1897	57.63891388	1947	57.69227073	1997	57.74344540
1848	57.58435936	1898	57.64000337	1948	57.69331513	1998	57.74444762
1849	57.58549615	1899	57.64109193	1949	57.69435865	1999	57.74544902
1850	57.58663195	1900	57.64217956	1950	57.69540130	2000	57.74644960

TABLES MINORANT LA RACINE N-IÈME DU DISCRIMINANT D'UN COEFF DE DEGRÉ N
 TABLE 3 DEGRÉS JUSQU'À 10 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

		(R1=1,R2=0) 0.99999524						
		(R1=2,R2=0) 2.22000480		(R1=0,R2=1) 1.72976357				
		(R1=3,R2=0) 3.61287391		(R1=1,R2=1) 2.81857020				
	(R1=4,R2=0) 5.06743654		(R1=2,R2=1) 4.01432161		(R1=0,R2=2) 3.25849871			
	(R1=5,R2=0) 6.52409907		(R1=3,R2=1) 5.26383942		(R1=1,R2=2) 4.31751258			
	(R1=6,R2=0) 7.94246946		(R1=4,R2=1) 6.52393917		(R1=2,R2=2) 5.41944674	(R1=0,R2=3) 4.55778197		
	(R1=7,R2=0) 9.30278369		(R1=5,R2=1) 7.76649516		(R1=3,R2=2) 6.53551098	(R1=1,R2=3) 5.54854770		
	(R1=8,R2=0) 10.59726213		(R1=6,R2=1) 8.97498090		(R1=4,R2=2) 7.64486352	(R1=2,R2=3) 6.55403731	(R1=0,R2=4) 5.65939882	
	(R1=9,R2=0) 11.82429302		(R1=7,R2=1) 10.14043031		(R1=5,R2=2) 8.73370621	(R1=3,R2=3) 7.55835445	(R1=1,R2=4) 6.57637470	
(R1=10,R2=0) 12.08531886		(R1=8,R2=1) 11.25857377		(R1=6,R2=2) 9.79345912		(R1=4,R2=3) 8.55020464	(R1=2,R2=4) 7.49528026	(R1=0,R2=5) 6.60034321

TABLES MINORANT LA RACINE N-IEME DU DISCRIMINANT D'UN CORPS DE DEGRÉ N

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
1	1	0	.99797716	13	5	4	10.18338973	19	3	8	10.77371154
2	0	1	1.72211973	13	7	3	11.38769554	19	5	7	11.68058413
2	2	0	2.22342732	13	9	2	12.75985275	19	7	6	12.67569669
3	1	1	2.81343730	13	11	1	14.32325995	19	9	5	13.76751698
3	3	0	3.61083751	13	13	0	16.10473045	19	11	4	14.96536966
4	0	2	3.25456113	14	0	7	8.12243771	19	13	3	16.27952258
4	2	1	4.01089571	14	2	6	8.97876176	19	15	2	17.72128160
4	4	0	5.06708186	14	4	5	9.94681540	19	17	1	19.30309486
5	1	2	4.31479930	14	6	4	11.04087827	19	19	0	21.03866764
5	3	1	5.26129587	14	8	3	12.27715123	20	0	10	9.80570086
5	5	0	6.52353045	14	10	2	13.67402741	20	2	9	10.58080421
6	0	3	4.55706701	14	12	1	15.25239633	20	4	8	11.42793023
6	2	2	5.41776306	14	14	0	17.03598711	20	6	7	12.35360556
6	4	1	6.52207971	15	1	7	8.85436534	20	8	6	13.36498566
6	6	0	7.94143600	15	3	6	9.74781714	20	10	5	14.46991546
7	1	3	5.54811418	15	5	5	10.75033378	20	12	4	15.67699535
7	3	2	6.53455065	15	7	4	11.87499386	20	14	3	16.99565327
7	5	1	7.76526349	15	9	3	13.13653064	20	16	2	18.43622364
7	7	0	9.30172224	15	11	2	14.55154702	20	18	1	20.01003387
8	0	4	5.65936246	15	13	1	16.13875589	20	20	0	21.72949918
8	2	3	6.55381277	15	15	0	17.91924997	21	1	10	10.40990359
8	4	2	7.64436279	16	0	8	8.74841810	21	3	9	11.20467132
8	6	1	8.97425779	16	2	7	9.57833342	21	5	8	12.06983774
8	8	0	10.59647163	16	4	6	10.50366378	21	7	7	13.01150569
9	1	4	6.57635765	16	6	5	11.53512848	21	9	6	14.03633935
9	3	3	7.55825321	16	8	4	12.68472054	21	11	5	15.15161552
9	5	2	8.73346960	16	10	3	13.96586257	21	13	4	16.36527919
9	7	1	10.14005352	16	12	2	15.39357940	21	15	3	17.68600421
9	9	0	11.82381520	16	14	1	16.98469030	21	17	2	19.12325949
10	0	5	6.60034164	16	16	0	18.75802364	21	19	1	20.68738116
10	2	4	7.49527455	17	1	8	9.43243628	21	21	0	22.38965161
10	4	3	8.55016525	17	3	7	10.29183495	22	0	11	10.25752840
10	6	2	9.79335887	17	5	6	11.24438337	22	2	10	11.00605553
10	8	1	11.25839886	17	7	5	12.29998066	22	4	9	11.81805922
10	10	0	12.98507175	17	9	4	13.46963887	22	6	8	12.69878790
11	1	5	7.44833187	17	11	3	14.76560970	22	8	7	13.65395195
11	3	4	8.40682062	17	13	2	16.20152468	22	10	6	14.68976398
11	5	3	9.52196234	17	15	1	17.79255041	22	12	5	15.81298233
11	7	2	10.81912035	17	17	0	19.55556126	22	14	4	17.03095834
11	9	1	12.32794920	18	0	9	9.30567232	22	16	3	18.35168763
11	11	0	14.08316564	18	2	8	10.10811543	22	18	2	19.78386595
12	0	6	7.41287924	18	4	7	10.99302507	22	20	1	21.33694991
12	2	5	8.29230192	18	6	6	11.96867180	22	22	0	23.02122313
12	4	4	9.30437412	18	8	5	13.04420623	23	1	11	10.82829437
12	6	3	10.46877958	18	10	4	14.22975404	23	3	10	11.59324614
12	8	2	11.86825559	18	12	3	15.53652010	23	5	9	12.42029182
12	10	1	13.34910019	18	14	2	16.97690325	23	7	8	13.31436272
12	12	0	15.12175144	18	16	1	18.56462300	23	9	7	14.28080602
13	1	6	8.19920869	18	18	0	20.31485976	23	11	6	15.32541919
13	3	5	9.12650886	19	1	9	9.94738918	23	13	5	16.45448726

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
23	15	4	17.67482314	27	11	8	15.64010497	30	22	4	21.63938223
23	17	3	18.99381128	27	13	7	16.63406837	30	24	3	22.91556688
23	19	2	20.41945510	27	15	6	17.69689534	30	26	2	24.27166619
23	21	1	21.96042831	27	17	5	18.83334897	30	28	1	25.71271565
23	23	0	23.62613074	27	19	4	20.04853381	30	30	0	27.24407525
24	0	12	10.66833176	27	21	3	21.34792001	31	1	15	12.17453881
24	2	11	11.39136492	27	23	2	22.73736914	31	3	14	12.83746028
24	4	10	12.17079114	27	25	1	24.22316201	31	5	13	13.54073642
24	6	9	13.01089901	27	27	0	25.81202843	31	7	12	14.28677133
24	8	8	13.91632458	28	0	14	11.38891460	31	9	11	15.07812112
24	10	7	14.89207891	28	2	13	12.06467774	31	11	10	15.91750325
24	12	6	15.94357782	28	4	12	12.78586572	31	13	9	16.80780625
24	14	5	17.07667386	28	6	11	13.55545729	31	15	8	17.75210019
24	16	4	18.29769097	28	8	10	14.37663937	31	17	7	18.75364779
24	18	3	19.61346181	28	10	9	15.25282104	31	19	6	19.81591617
24	20	2	21.03136823	28	12	8	16.18764859	31	21	5	20.94258946
24	22	1	22.55938498	28	14	7	17.18502152	31	23	4	22.13758213
24	24	0	24.20612705	28	16	6	18.24910966	31	25	3	23.40505320
25	1	12	11.20914129	28	18	5	19.38437158	31	27	2	24.74942142
25	3	11	11.94606191	28	20	4	20.59557413	31	29	1	26.17538126
25	5	10	12.73819153	28	22	3	21.88781354	31	31	0	27.68792012
25	7	9	13.58957639	28	24	2	23.26653786	32	0	16	12.00221881
25	9	8	14.50457770	28	26	1	24.73757107	32	2	15	12.63569877
25	11	7	15.48789558	28	28	0	26.30713883	32	4	14	13.30660066
25	13	6	16.54459477	29	1	14	11.87834792	32	6	13	14.01708275
25	15	5	17.68013234	29	3	13	12.56434875	32	8	12	14.76943586
25	17	4	18.90038749	29	5	12	13.29488988	32	10	11	15.56609115
25	19	3	20.21169371	29	7	11	14.07280083	32	12	10	16.40962835
25	21	2	21.62087349	29	9	10	14.90110203	32	14	9	17.30278457
25	23	1	23.13527570	29	11	9	15.78301722	32	16	8	18.24846351
25	25	0	24.76281595	29	13	8	16.72198674	32	18	7	19.24974541
26	0	13	11.04389070	29	15	7	17.72168162	32	20	6	20.30989750
26	2	12	11.74265490	29	17	6	18.78601867	32	22	5	21.43238515
26	4	11	12.49187356	29	19	5	19.91917662	32	24	4	22.62088368
26	6	10	13.29509955	29	21	4	21.12561329	32	26	3	23.87929095
26	8	9	14.15615230	29	23	3	22.41008400	32	28	2	25.21174070
26	10	8	15.07913733	29	25	2	23.77766120	32	30	1	26.62261669
26	12	7	16.06846703	29	27	1	25.23375545	32	32	0	28.11656772
26	14	6	17.12888306	29	29	0	26.78413778	33	1	16	12.44923817
26	16	5	18.26548040	30	0	15	11.70728205	33	3	15	13.09052139
26	18	4	19.48373316	30	2	14	12.36129857	33	5	14	13.76854992
26	20	3	20.78952238	30	4	13	13.05644123	33	7	13	14.48538482
26	22	2	22.18916593	30	6	12	13.79523379	33	9	12	15.24320981
26	24	1	23.68945068	30	8	11	14.58036504	33	11	11	16.04433833
26	26	0	25.29766701	30	10	10	15.41469911	33	13	10	16.89122087
27	1	13	11.55772701	30	12	9	16.30126652	33	15	9	17.78645282
27	3	12	12.26835922	30	14	8	17.24337588	33	17	8	18.73278282
27	5	11	13.02842565	30	16	7	18.24442640	33	19	7	19.73312151
27	7	10	13.84129046	30	18	6	19.30812124	33	21	6	20.79055094
27	9	9	14.71056103	30	20	5	20.43838167	33	23	5	21.90833441

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
33	25	4	23.08992705	36	18	9	19.17213501	39	3	18	13.75116634
33	27	3	24.33898688	36	20	8	20.11674325	39	5	17	14.36356762
33	29	2	25.65938667	36	22	7	21.11090655	39	7	16	15.00578229
33	31	1	27.05522642	36	24	6	22.15722749	39	9	15	15.67923760
33	33	0	28.53084665	36	26	5	23.25844907	39	11	14	16.38543284
34	0	17	12.27643183	36	28	4	24.41746220	39	13	13	17.12594278
34	2	16	12.89052484	36	30	3	25.63731358	39	15	12	17.90242131
34	4	15	13.53882424	36	32	2	26.92121404	39	17	11	18.71660528
34	6	14	14.22319107	36	34	1	28.27254728	39	19	10	19.57031852
34	8	13	14.94559414	36	36	0	29.69487918	39	21	9	20.46547609
34	10	12	15.70811597	37	1	18	12.94364584	39	23	8	21.40408872
34	12	11	16.51295906	37	3	17	13.54554262	39	25	7	22.38826750
34	14	10	17.36245256	37	5	16	14.17830702	39	27	6	23.42022881
34	16	9	18.25905927	37	7	15	14.84348954	39	29	5	24.50229949
34	18	8	19.20538313	37	9	14	15.54272329	39	31	4	25.63692229
34	20	7	20.20417705	37	11	13	16.27772810	39	33	3	26.82666157
34	22	6	21.25835132	37	13	12	17.05031499	39	35	2	28.07420936
34	24	5	22.37098239	37	15	11	17.86239074	39	37	1	29.38239159
34	26	4	23.54532228	37	17	10	18.71596283	39	39	0	30.75417480
34	28	3	24.78480842	37	19	9	19.61314459	40	0	20	12.99600130
34	30	2	26.09307419	37	21	8	20.55616059	40	2	19	13.55814891
34	32	1	27.47395994	37	23	7	21.54735246	40	4	18	14.14703750
34	34	0	28.93152480	37	25	6	22.58918485	40	6	17	14.76391120
35	1	17	12.70491168	37	27	5	23.68425183	40	8	16	15.41007562
35	3	16	13.32588817	37	29	4	24.83528362	40	10	15	16.08690073
35	5	15	13.98047445	37	31	3	26.04515361	40	12	14	16.79582387
35	7	14	14.67045172	37	33	2	27.31688586	40	14	13	17.53835288
35	9	13	15.39770133	37	35	1	28.65366293	40	16	12	18.31606947
35	11	12	16.16421013	37	37	0	30.05883413	40	18	11	19.13063268
35	13	11	16.97207616	38	0	19	12.77150927	40	20	10	19.98378254
35	15	10	17.82351457	38	2	18	13.35000504	40	22	9	20.87734394
35	17	9	18.72086404	38	4	17	13.95742634	40	24	8	21.81323068
35	19	8	19.66659339	38	6	16	14.59518709	40	26	7	22.79344968
35	21	7	20.66330870	38	8	15	15.26477470	40	28	6	23.82010550
35	23	6	21.71376078	38	10	14	15.96775365	40	30	5	24.89540497
35	25	5	22.82085306	38	12	13	16.70576930	40	32	4	26.02166213
35	27	4	23.98764997	38	14	12	17.48055190	40	34	3	27.20130339
35	29	3	25.21738571	38	16	11	18.29392078	40	36	2	28.43687294
35	31	2	26.51347365	38	18	10	19.14778879	40	38	1	29.73103845
35	33	1	27.87951612	38	20	9	20.04416697	40	40	0	31.08659710
35	35	0	29.31931487	38	22	8	20.98516948	41	1	20	13.37716177
36	0	18	12.53221127	38	24	7	21.97301878	41	3	19	13.94419712
36	2	17	13.12799938	38	26	6	23.01005104	41	5	18	14.53755259
36	4	16	13.75518379	38	28	5	24.09872191	41	7	17	15.15842557
36	6	15	14.41538122	38	30	4	25.24161256	41	9	16	15.80807115
36	8	14	15.11929694	38	32	3	26.44143602	41	11	15	16.48780472
36	10	13	15.84172938	38	34	2	27.70104383	41	13	14	17.19900474
36	12	12	16.61157500	38	36	1	29.02343313	41	15	13	17.94311564
36	14	11	17.42183337	38	38	0	30.41175404	41	17	12	18.72165083
36	16	10	18.27461259	39	1	19	13.16721990	41	19	11	19.53619590

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
41	21	10	20.38841198	43	35	4	27.11662257	45	45	0	32.61412232
41	23	9	21.28003920	43	37	3	28.26607756	46	0	23	13.59419382
41	25	8	22.21290042	43	39	2	29.46633719	46	2	22	14.11232547
41	27	7	23.18890507	43	41	1	30.71966029	46	4	21	14.65196901
41	29	6	24.21005319	43	43	0	32.02840772	46	6	20	15.21399910
41	31	5	25.27843968	44	0	22	13.40616594	46	8	19	15.79932808
41	33	4	26.39625876	44	2	21	13.93819127	46	10	18	16.40890752
41	35	3	27.56580861	44	4	20	14.49328288	46	12	17	17.04372979
41	37	2	28.78949630	44	6	19	15.07241970	46	14	16	17.70482974
41	39	1	30.06984290	44	8	18	15.67662475	46	16	15	18.39328641
41	41	0	31.40948885	44	10	17	16.30696699	46	18	14	19.11022487
42	0	21	13.20713446	44	12	16	16.96456325	46	20	13	19.85681811
42	2	20	13.75381254	44	14	15	17.65058030	46	22	12	20.63428899
42	4	19	14.32529024	44	16	14	18.36623694	46	24	11	21.44391235
42	6	18	14.92266838	44	18	13	19.11280627	46	26	10	22.28701713
42	8	17	15.54709961	44	20	12	19.89161804	46	28	9	23.16498866
42	10	16	16.19979079	44	22	11	20.70406105	46	30	8	24.07927095
42	12	15	16.88290532	44	24	10	21.55158574	46	32	7	25.03136922
42	14	14	17.59506574	44	26	9	22.43570686	46	34	6	26.02285237
42	16	13	18.34035630	44	28	8	23.35800626	46	36	5	27.05535575
42	18	12	19.11932581	44	30	7	24.32013583	46	38	4	28.13058385
42	20	11	19.93349053	44	32	6	25.32382054	46	40	3	29.25031325
42	22	10	20.78443718	44	34	5	26.37086166	46	42	2	30.41639568
42	24	9	21.67382622	44	36	4	27.46314006	46	44	1	31.63076112
42	26	8	22.60339513	44	38	3	28.60261978	46	46	0	32.89542112
42	28	7	23.57496195	44	40	2	29.79135157	47	1	23	13.93756474
42	30	6	24.59042898	44	42	1	31.03147682	47	3	22	14.45931298
42	32	5	25.65178659	44	44	0	32.32523145	47	5	21	15.00226512
42	34	4	26.76111731	45	1	22	13.76125844	47	7	20	15.56726656
42	36	3	27.92060001	45	3	21	14.29726653	47	9	19	16.15519834
42	38	2	29.13251437	45	5	20	14.85600036	47	11	18	16.76697852
42	40	1	30.39924549	45	7	19	15.43840489	47	13	17	17.40356367
42	42	0	31.72328875	45	9	18	16.04546666	47	15	16	18.06595041
43	1	21	13.57479194	45	11	17	16.67821547	47	17	15	18.75517703
43	3	20	14.12587293	45	13	16	17.33772622	47	19	14	19.47232511
43	5	19	14.76137569	45	15	15	18.02512073	47	21	13	20.21852133
43	7	18	15.30236131	45	17	14	18.74156978	47	23	12	20.99493925
43	9	17	15.92993967	45	19	13	19.48829510	47	25	11	21.80280125
43	11	16	16.58527158	45	21	12	20.26657156	47	27	10	22.64338049
43	13	15	17.26957093	45	23	11	21.07772942	47	29	9	23.51800297
43	15	14	17.98410707	45	25	10	21.92315664	47	31	8	24.42804973
43	17	13	18.73020724	45	27	9	22.80430136	47	33	7	25.37495904
43	19	12	19.50925908	45	29	8	23.72267445	47	35	6	26.36022881
43	21	11	20.32271333	45	31	7	24.67985221	47	37	5	27.38541900
43	23	10	21.17208859	45	33	6	25.67747913	47	39	4	28.45215416
43	25	9	22.05896427	45	35	5	26.71727083	47	41	3	29.56212610
43	27	8	22.98500366	45	37	4	27.80101711	47	43	2	30.71709668
43	29	7	23.95193710	45	39	3	28.93058513	47	45	1	31.91890065
43	31	6	24.96157534	45	41	2	30.10792272	47	47	0	33.16944871
43	33	5	26.01581107	45	43	1	31.33506187	48	0	24	13.77218205

TABLE 4 DEGRÉS JUSQU'À 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
48	2	23	14.27712551	50	2	24	14.43339206	51	51	0	34.19864317
48	4	22	14.80218139	50	4	23	14.94465109	52	0	26	14.10134283
48	6	21	15.34813452	50	6	22	15.47546486	52	2	25	14.58183255
48	8	20	15.91580219	50	8	21	16.02656850	52	4	24	15.08002304
48	10	19	16.50603535	50	10	20	16.59872627	52	6	23	15.59655364
48	12	18	17.11971999	50	12	19	17.19273260	52	8	22	16.13208812
48	14	17	17.75777844	50	14	18	17.80941327	52	10	21	16.68731552
48	16	16	18.42117084	50	16	17	18.44962655	52	12	20	17.26295110
48	18	15	19.11089659	50	18	16	19.11426448	52	14	19	17.85973727
48	20	14	19.82799593	50	20	15	19.80425407	52	16	18	18.47844453
48	22	13	20.57355152	50	22	14	20.52055868	52	18	17	19.11987255
48	24	12	21.34869018	50	24	13	21.26417942	52	20	16	19.78485120
48	26	11	22.15458457	50	26	12	22.03615652	52	22	15	20.47424163
48	28	10	22.99245508	50	28	11	22.83757091	52	24	14	21.18893748
48	30	9	23.86357171	50	30	10	23.66954571	52	26	13	21.92986599
48	32	8	24.76925605	50	32	9	24.53324790	52	28	12	22.69798931
48	34	7	25.71088337	50	34	8	25.42988998	52	30	11	23.49430573
48	36	6	26.68988474	50	36	7	26.36073173	52	32	10	24.31985106
48	38	5	27.70774931	50	38	6	27.32708204	52	34	9	25.17569997
48	40	4	28.76602663	50	40	5	28.33030080	52	36	8	26.06296747
48	42	3	29.86632908	50	42	4	29.37180087	52	38	7	26.98281039
48	44	2	31.01033439	50	44	3	30.45305015	52	40	6	27.93642893
48	46	1	32.19978833	50	46	2	31.57557367	52	42	5	28.92506828
48	48	0	33.43650739	50	48	1	32.74095586	52	44	4	29.95002028
49	1	24	14.10459243	50	50	0	33.95084280	52	46	3	31.01262519
49	3	23	14.61283169	51	1	25	14.26311959	52	48	2	32.11427343
49	5	22	15.14090388	51	3	24	14.75854433	52	50	1	33.25640754
49	7	21	15.68956851	51	5	23	15.27256233	52	52	0	34.44052406
49	9	20	16.25961580	51	7	22	15.80585861	53	1	26	14.41383599
49	11	19	16.85186790	51	9	21	16.35914483	53	3	25	14.89708938
49	13	18	17.46718002	51	11	20	16.93316024	53	5	24	15.39781126
49	15	17	18.10644177	51	13	19	17.52867273	53	7	23	15.91662169
49	17	16	18.77957843	51	15	18	18.14647986	53	9	22	16.45416394
49	19	15	19.46055237	51	17	17	18.78740995	53	11	21	17.01110532
49	21	14	20.17736444	51	19	16	19.45232323	53	13	20	17.58813801
49	23	13	20.92205549	51	21	15	20.14211303	53	15	19	18.18597995
49	25	12	21.69570793	51	23	14	20.85770700	53	17	18	18.70537575
49	27	11	22.49944735	51	25	13	21.60006840	53	19	17	19.44709764
49	29	10	23.33444417	51	27	12	22.37019742	53	21	16	20.11194647
49	31	9	24.20191545	51	29	11	23.16913262	53	23	15	20.80075270
49	33	8	25.10312668	51	31	10	23.99795228	53	25	14	21.51437752
49	35	7	26.03939371	51	33	9	24.85777600	53	27	13	22.25371391
49	37	6	27.01208470	51	35	8	25.74976615	53	29	12	23.01968779
49	39	5	28.02262223	51	37	7	26.67512961	53	31	11	23.81325925
49	41	4	29.07248538	51	39	6	27.63511934	53	33	10	24.63542375
49	43	3	30.16321201	51	41	5	28.63103619	53	35	9	25.48721345
49	45	2	31.29640108	51	43	4	29.66423070	53	37	8	26.36969846
49	47	1	32.47371503	51	45	3	30.73610500	53	39	7	27.28398832
49	49	0	33.69688235	51	47	2	31.84811474	53	41	6	28.23123338
50	0	25	13.94998073	51	49	1	33.00177116	53	43	5	29.21262629

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
53	45	4	30.22940357	55	35	10	25.24829086	57	21	18	20.06423063
53	47	3	31.28284720	55	37	9	26.09175131	57	23	17	20.70535037
53	49	2	32.37428628	55	39	8	26.96453049	57	25	16	21.36799017
53	51	1	33.50509876	55	41	7	27.86765076	57	27	15	22.05287091
53	53	0	34.67671323	55	43	6	28.80217075	57	29	14	22.76073822
54	0	27	14.25393801	55	45	5	29.76918663	57	31	13	23.49236335
54	2	26	14.72307475	55	47	4	30.76983342	57	33	12	24.24854401
54	4	25	15.20886880	55	49	3	31.80528636	57	35	11	25.03010528
54	6	24	15.71190027	55	51	2	32.87676237	57	37	10	25.83790051
54	8	23	16.23277059	55	53	1	33.98552144	57	39	9	26.67281231
54	10	22	16.77210331	55	55	0	35.13286825	57	41	8	27.53575350
54	12	21	17.33054479	56	0	28	14.39936405	57	43	7	28.42766817
54	14	20	17.90876504	56	2	27	14.85767798	57	45	6	29.34953275
54	16	19	18.50745854	56	4	26	15.33169701	57	47	5	30.30235705
54	18	18	19.12734507	56	6	25	15.82194918	57	49	4	31.28718545
54	20	17	19.76917059	56	8	24	16.32898128	57	51	3	32.30509809
54	22	16	20.43370821	56	10	23	16.85335945	57	53	2	33.35721201
54	24	15	21.12175910	56	12	22	17.39566987	57	55	1	34.44468250
54	26	14	21.83415348	56	14	21	17.95651937	57	57	0	35.56870432
54	28	13	22.57175169	56	16	20	18.53653619	58	0	29	14.53815649
54	30	12	23.33544522	56	18	19	19.13637065	58	2	28	14.98614244
54	32	11	24.12615783	56	20	18	19.75669589	58	4	27	15.44896208
54	34	10	24.94484670	56	22	17	20.39820869	58	6	26	15.92709751
54	36	9	25.79250360	56	24	16	21.06163023	58	8	25	16.42104733
54	38	8	26.67015619	56	26	15	21.74770695	58	10	24	16.93132724
54	40	7	27.57886921	56	28	14	22.45721140	58	12	23	17.45847054
54	42	6	28.51974588	56	30	13	23.19094311	58	14	22	18.00302869
54	44	5	29.49392926	56	32	12	23.94972955	58	16	21	18.56557193
54	46	4	30.50260366	56	34	11	24.73442709	58	18	20	19.14668989
54	48	3	31.54699614	56	36	10	25.54592196	58	20	19	19.74699218
54	50	2	32.62837804	56	38	9	26.38513129	58	22	18	20.36710909
54	52	1	33.74806656	56	40	8	27.25300421	58	24	17	21.00769223
54	54	0	34.90742643	56	42	7	28.15052291	58	26	16	21.66941527
55	1	27	14.55735552	56	44	6	29.07870380	58	28	15	22.35297464
55	3	26	15.02903417	56	46	5	30.03859868	58	30	14	23.05090929
55	5	25	15.51715749	56	48	4	31.03129601	58	32	13	23.78850645
55	7	24	16.02228861	56	50	3	32.05792211	58	34	12	24.54199247
55	9	23	16.54501104	56	52	2	33.11964253	58	36	11	25.32034362
55	11	22	17.08592926	56	54	1	34.21766338	58	38	10	26.12438198
55	13	21	17.64566951	56	56	0	35.35323277	58	40	9	26.95495731
55	15	20	18.22488050	57	1	28	14.69422665	58	42	8	27.81294798
55	17	19	18.82423416	57	3	27	15.15488481	58	44	7	28.69926192
55	19	18	19.44442648	57	5	26	15.63105287	58	46	6	29.61483761
55	21	17	20.08617829	57	7	25	16.12324392	58	48	5	30.56064512
55	23	16	20.75023616	57	9	24	16.63198893	58	50	4	31.53768713
55	25	15	21.43737327	57	11	23	17.15783732	58	52	3	32.54700004
55	27	14	22.14839032	57	13	22	17.70135760	58	54	2	33.58965512
55	29	13	22.88411655	57	15	21	18.26313795	58	56	1	34.66675962
55	31	12	23.64541063	57	17	20	18.84378691	58	58	0	35.77945804
55	33	11	24.43316180	57	19	19	19.44393405	59	1	29	14.82494114

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
59	3	28	15.27509445	60	42	9	27.50326330	62	18	22	19.17037557
59	5	27	15.73990182	60	44	8	28.35132020	62	20	21	19.73447946
59	7	26	16.21983212	60	46	7	29.22646258	62	22	20	20.31603120
59	9	25	16.71536997	60	48	6	30.12955879	62	24	19	20.91556821
59	11	24	17.22701629	60	50	5	31.06150539	62	26	18	21.53364497
59	13	23	17.75528882	60	52	4	32.02322815	62	28	17	22.17083348
59	15	22	18.30072263	60	54	3	33.01568292	62	30	16	22.82772384
59	17	21	18.86387067	60	56	2	34.03985664	62	32	15	23.50492483
59	19	20	19.44530437	60	58	1	35.09676832	62	34	14	24.20306442
59	21	19	20.04561420	60	60	0	36.18747012	62	36	13	24.92279043
59	23	18	20.66541030	61	1	30	14.94994135	62	38	12	25.66477111
59	25	17	21.30532313	61	3	29	15.39007025	62	40	11	26.42969582
59	27	16	21.96600410	61	5	28	15.84406757	62	42	10	27.21827562
59	29	15	22.64812625	61	7	27	16.31236292	62	44	9	28.03124400
59	31	14	23.35238498	61	9	26	16.79539990	62	46	8	28.86935757
59	33	13	24.07949875	61	11	25	17.29363654	62	48	7	29.73339678
59	35	12	24.83020983	61	13	24	17.80754573	62	50	6	30.62416664
59	37	11	25.60528511	61	15	23	18.33761570	62	52	5	31.54249753
59	39	10	26.40551689	61	17	22	18.88435047	62	54	4	32.48924598
59	41	9	27.23172367	61	19	21	19.44827035	62	56	3	33.46529548
59	43	8	28.08475108	61	21	20	20.02991245	62	58	2	34.47155733
59	45	7	28.96547271	61	23	19	20.62983117	62	60	1	35.50897152
59	47	6	29.87479107	61	25	18	21.24859879	62	62	0	36.57850761
59	49	5	30.81363851	61	27	17	21.88680600	63	1	31	15.06962646
59	51	4	31.78297822	61	29	16	22.54506246	63	3	30	15.50017925
59	53	3	32.78380524	61	31	15	23.22399745	63	5	29	15.94387746
59	55	2	33.81714749	61	33	14	23.92426043	63	7	28	16.40111574
59	57	1	34.88406690	61	35	13	24.64652171	63	9	27	16.87230122
59	59	0	35.98566048	61	37	12	25.39147309	63	11	26	17.35785383
60	0	30	14.67079670	61	39	11	26.15982857	63	13	25	17.85820674
60	2	29	15.10891705	61	41	10	26.95232500	63	15	24	18.37380670
60	4	28	15.56107149	61	43	9	27.76972287	63	17	23	18.90511447
60	6	27	16.02770139	61	45	8	28.61280699	63	19	22	19.45260522
60	8	26	16.50926278	61	47	7	29.48238733	63	21	21	20.01676901
60	10	25	17.00622677	61	49	6	30.37929976	63	23	20	20.59811116
60	12	24	17.51908001	61	51	5	31.30440691	63	25	19	21.19715280
60	14	23	18.04832523	61	53	4	32.25859903	63	27	18	21.81443129
60	16	22	18.59448169	61	55	3	33.24279482	63	29	17	22.45050071
60	18	21	19.15808569	61	57	2	34.25794239	63	31	16	23.10593240
60	20	20	19.73969119	61	59	1	35.30502017	63	33	15	23.78131549
60	22	19	20.33987025	61	61	0	36.38503790	63	35	14	24.47725740
60	24	18	20.95921370	62	0	31	14.79771873	63	37	13	25.19438444
60	26	17	21.59833169	62	2	30	15.22640602	63	39	12	25.93334236
60	28	16	22.25785431	62	4	29	15.66839184	63	41	11	26.69479696
60	30	15	22.93843226	62	6	28	16.12408138	63	43	10	27.47943472
60	32	14	23.64073743	62	8	27	16.59389280	63	45	9	28.28796340
60	34	13	24.36546367	62	10	26	17.07825771	63	47	8	29.12111273
60	36	12	25.11332743	62	12	25	17.57762147	63	49	7	29.97963504
60	38	11	25.88506854	62	14	24	18.09244369	63	51	6	30.86430601
60	40	10	26.68145090	62	16	23	18.62319861	63	53	5	31.77592536

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
63	55	4	32.71531759	65	25	20	21.15041165	66	58	4	33.36747410
63	57	3	33.68333275	65	27	19	21.74815005	66	60	3	34.31204863
63	59	2	34.68084724	65	29	18	22.36353792	66	62	2	35.28412980
63	61	1	35.70876460	65	31	17	22.99709566	66	64	1	36.28452263
63	63	0	36.76801637	65	33	16	23.64935935	66	66	0	37.31405592
64	0	32	14.91931511	65	35	15	24.32088123	67	1	33	15.29446301
64	2	31	15.33897443	65	37	14	25.01223019	67	3	32	15.70709342
64	4	30	15.77125406	65	39	13	25.72399225	67	5	31	16.13158571
64	6	29	16.21652685	65	41	12	26.45677107	67	7	30	16.56827537
64	8	28	16.67517727	65	43	11	27.21118848	67	9	29	17.01750783
64	10	27	17.14760173	65	45	10	27.98788504	67	11	28	17.47963879
64	12	26	17.63420890	65	47	9	28.78752054	67	13	27	17.95503446
64	14	25	18.13542014	65	49	8	29.61077463	67	15	26	18.44407187
64	16	24	18.65166977	65	51	7	30.45834741	67	17	25	18.94713920
64	18	23	19.18340555	65	53	6	31.33095998	67	19	24	19.46463602
64	20	22	19.73108900	65	55	5	32.22935516	67	21	23	19.99697370
64	22	21	20.29519587	65	57	4	33.15429806	67	23	22	20.54457570
64	24	20	20.87621651	65	59	3	34.10657679	67	25	21	21.10787789
64	26	19	21.47465635	65	61	2	35.08700313	67	27	20	21.68732897
64	28	18	22.09103630	65	63	1	36.09641325	67	29	19	22.28339076
64	30	17	22.72589327	65	65	0	37.13566844	67	31	18	22.89653863
64	32	16	23.37978060	66	0	33	15.03594180	67	33	17	23.52726187
64	34	15	24.05326858	66	2	32	15.44695300	67	35	16	24.17606409
64	36	14	24.74694495	66	4	31	15.86995772	67	37	15	24.84346362
64	38	13	25.46141545	66	6	30	16.30529990	67	39	14	25.52999396
64	40	12	26.19730430	66	8	29	16.75333384	67	41	13	26.23620419
64	42	11	26.95525483	66	10	28	17.21442454	67	43	12	26.96265942
64	44	10	27.73593002	66	12	27	17.68894795	67	45	11	27.70994130
64	46	9	28.54001309	66	14	26	18.17729132	67	47	10	28.47864841
64	48	8	29.36820815	66	16	25	18.67985350	67	49	9	29.26939685
64	50	7	30.22124077	66	18	24	19.19704526	67	51	8	30.08282067
64	52	6	31.09985868	66	20	23	19.72928967	67	53	7	30.91957242
64	54	5	32.00483246	66	22	22	20.27702242	67	55	6	31.78032370
64	56	4	32.93695615	66	24	21	20.84069218	67	57	5	32.66576568
64	58	3	33.89704805	66	26	20	21.42076102	67	59	4	33.57660970
64	60	2	34.88595143	66	28	19	22.01770473	67	61	3	34.51358782
64	62	1	35.91453526	66	30	18	22.63201328	67	63	2	35.47745348
64	64	0	36.95369502	66	32	17	23.26419119	67	65	1	36.46898204
65	1	32	15.18435772	66	34	16	23.91475797	67	67	0	37.48897151
65	3	31	15.60575333	66	36	15	24.58424856	68	0	34	15.14792249
65	5	30	16.03962741	66	38	14	25.27321378	68	2	33	15.55064214
65	7	29	16.48634340	66	40	13	25.98222079	68	4	32	15.96477485
65	9	28	16.94627589	66	42	12	26.71185355	68	6	31	16.39063857
65	11	27	17.41981090	66	44	11	27.46271335	68	8	30	16.828856057
65	13	26	17.90734620	66	46	10	28.23541929	68	10	29	17.27887769
65	15	25	18.40929172	66	48	9	29.03060883	68	12	28	17.74193659
65	17	24	18.92606979	66	50	8	29.84893828	68	14	27	18.21809406
65	19	23	19.45811562	66	52	7	30.69108340	68	16	26	18.70771725
65	21	22	20.00587757	66	54	6	31.55773997	68	18	25	19.21118398
65	23	21	20.56981760	66	56	5	32.44962435	68	20	24	19.72888305

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
68	22	23	20.26121451	69	53	8	30.53820662	71	11	30	17.59337997
68	24	22	20.80859001	69	55	7	31.36428161	71	13	29	18.04631959
68	26	21	21.37143310	69	57	6	32.21337901	71	15	28	18.51154078
68	28	20	21.95017958	69	59	5	33.08614305	71	17	27	18.98937373
68	30	19	22.54527786	69	61	4	33.98323624	71	19	26	19.48015782
68	32	18	23.15718925	69	63	3	34.90533985	71	21	25	19.98424185
68	34	17	23.78638841	69	65	2	35.85315442	71	23	24	20.50198431
68	36	16	24.43336366	69	67	1	36.82740035	71	25	23	21.03375366
68	38	15	25.09861741	69	69	0	37.82881845	71	27	22	21.57992854
68	40	14	25.78266653	70	0	35	15.25555222	71	29	21	22.14089810
68	42	13	26.48604280	70	2	34	15.65031542	71	31	20	22.71706225
68	44	12	27.20929326	70	4	33	16.05595305	71	33	19	23.30883197
68	46	11	27.95298075	70	6	32	16.47275964	71	35	18	23.91662960
68	48	10	28.71768425	70	8	31	16.90103813	71	37	17	24.54088914
68	50	9	29.50399944	70	10	30	17.34110007	71	39	16	25.18205658
68	52	8	30.31253908	70	12	29	17.79326584	71	41	15	25.84059023
68	54	7	31.14393358	70	14	28	18.25786488	71	43	14	26.51696104
68	56	6	31.99883147	70	16	27	18.73523597	71	45	13	27.21165295
68	58	5	32.87789991	70	18	26	19.22572744	71	47	12	27.92516325
68	60	4	33.78182523	70	20	25	19.72969745	71	49	11	28.65800293
68	62	3	34.71131348	70	22	24	20.24751426	71	51	10	29.41069708
68	64	2	35.66709102	70	24	23	20.77955649	71	53	9	30.18378525
68	66	1	36.64990505	70	26	22	21.32621338	71	55	8	30.97782185
68	68	0	37.66052423	70	28	21	21.88788516	71	57	7	31.79337657
69	1	34	15.40024066	70	30	20	22.46498325	71	59	6	32.63103479
69	3	33	15.80447316	70	32	19	23.05793064	71	61	5	33.49139800
69	5	32	16.21999631	70	34	18	23.66716218	71	63	4	34.37508428
69	7	31	16.64712046	70	36	17	24.29312488	71	65	3	35.28272869
69	9	30	17.08616489	70	38	16	24.93627829	71	67	2	36.21498381
69	11	29	17.53745809	70	40	15	25.59709485	71	69	1	37.17252014
69	13	28	18.00133799	70	42	14	26.27606018	71	71	0	38.15602669
69	15	27	18.47815222	70	44	13	26.97367351	72	0	36	15.35910058
69	17	26	18.96825837	70	46	12	27.69044804	72	2	35	15.74622262
69	19	25	19.47202426	70	48	11	28.42691129	72	4	34	16.14371830
69	21	24	19.98982825	70	50	10	29.18360555	72	6	33	16.55106103
69	23	23	20.52705949	70	52	9	29.96108826	72	8	32	16.97093179
69	25	22	21.06911822	70	54	8	30.75993243	72	10	31	17.40121931
69	27	21	21.63141613	70	56	7	31.58072709	72	12	30	17.84302031
69	29	20	22.20937660	70	58	6	32.42407770	72	14	29	18.29663967
69	31	19	22.80343507	70	60	5	33.29060666	72	16	28	18.76239066
69	33	18	23.41403939	70	62	4	34.18095372	72	18	27	19.24059513
69	35	17	24.04165011	70	64	3	35.09577651	72	20	26	19.73158379
69	37	16	24.68674090	70	66	2	36.03575102	72	22	25	20.23569641
69	39	15	25.34979886	70	68	1	37.00157211	72	24	24	20.75328205
69	41	14	26.03132492	70	70	0	37.99395404	72	26	23	21.28469932
69	43	13	26.73183425	71	1	35	15.50196282	72	28	22	21.83031664
69	45	12	27.45185661	71	3	34	15.89814200	72	30	21	22.39051247
69	47	11	28.19193680	71	5	33	16.30508158	72	32	20	22.96567563
69	49	10	28.95263506	71	7	32	16.72306923	72	34	19	23.55620552
69	51	9	29.73452751	71	9	31	17.15240069	72	36	18	24.16251244

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
72	38	17	24.78501786	73	65	4	34.75299064	75	15	30	18.57628554
72	40	16	25.42415474	73	67	3	35.64657978	75	17	29	19.03142215
72	42	15	26.08036782	73	69	2	36.56374918	75	19	28	19.49825137
72	44	14	26.75411394	73	71	1	37.50512402	75	21	27	19.97707162
72	46	13	27.44586237	73	73	0	38.47134623	75	23	26	20.46818920
72	48	12	28.15609514	74	0	37	15.45881444	75	25	25	20.97191846
72	50	11	28.88530740	74	2	36	15.83859228	75	27	24	21.48858198
72	52	10	29.63400774	74	4	35	16.22827734	75	29	23	22.01851084
72	54	9	30.40271858	74	6	34	16.62812388	75	31	22	22.56204478
72	56	8	31.19197653	74	8	33	17.03839301	75	33	21	23.11953245
72	58	7	32.00233280	74	10	32	17.45935288	75	35	20	23.69133165
72	60	6	32.83435354	74	12	31	17.89127881	75	37	19	24.27780952
72	62	5	33.68862030	74	14	30	18.33445352	75	39	18	24.87934282
72	64	4	34.56573041	74	16	29	18.78916730	75	41	17	25.49631818
72	66	3	35.46629743	74	18	28	19.25571820	75	43	16	26.12913230
72	68	2	36.39095157	74	20	27	19.73441221	75	45	15	26.77819230
72	70	1	37.34034017	74	22	26	20.22556350	75	47	14	27.44391590
72	72	0	38.31512812	74	24	25	20.72949462	75	49	13	28.12673173
73	1	36	15.59987832	74	26	24	21.24653668	75	51	12	28.82707965
73	3	35	15.98832789	74	28	23	21.77702964	75	53	11	29.54541097
73	5	34	16.38704471	74	30	22	22.32132245	75	55	10	30.28218879
73	7	33	16.79629596	74	32	21	22.87977337	75	57	9	31.03788829
73	9	32	17.21635611	74	34	20	23.45275015	75	59	8	31.81299708
73	11	31	17.64750709	74	36	19	24.04063031	75	61	7	32.60801545
73	13	30	18.09003853	74	38	18	24.64380137	75	63	6	33.42345676
73	15	29	18.54424788	74	40	17	25.26266114	75	65	5	34.25584777
73	17	28	19.01044070	74	42	16	25.89761795	75	67	4	35.11772897
73	19	27	19.48893079	74	44	15	26.54909096	75	69	3	35.99765495
73	21	26	19.98004045	74	46	14	27.21751044	75	71	2	36.90019474
73	23	25	20.48410069	74	48	13	27.90331804	75	73	1	37.82593224
73	25	24	21.00145146	74	50	12	28.60696708	75	75	0	38.77546657
73	27	23	21.53244187	74	52	11	29.32892290	76	0	38	15.55492039
73	29	22	22.07743045	74	54	10	30.06966315	76	2	37	15.92763403
73	31	21	22.63678537	74	56	9	30.82967809	76	4	36	16.30981972
73	33	20	23.21088474	74	58	8	31.60947097	76	6	35	16.70171434
73	35	19	23.80011680	74	60	7	32.40955833	76	8	34	17.10356099
73	37	18	24.40488026	74	62	6	33.23047038	76	10	33	17.51561914
73	39	17	25.02558453	74	64	5	34.07275132	76	12	32	17.93811476
73	41	16	25.66265003	74	66	4	34.93695976	76	14	31	18.37134053
73	43	15	26.31650844	74	68	3	35.82366906	76	16	30	18.81555598
73	45	14	26.98760307	74	70	2	36.73346772	76	18	29	19.27103763
73	47	13	27.67638909	74	72	1	37.66695983	76	20	28	19.73806922
73	49	12	28.38333390	74	74	0	38.62476540	76	22	27	20.21694186
73	51	11	29.10891742	75	1	37	15.69421520	76	24	26	20.70795421
73	53	10	29.85363246	75	3	36	16.07523963	76	26	25	21.21141267
73	55	9	30.61798501	75	5	35	16.46607185	76	28	24	21.72763159
73	57	8	31.40249464	75	7	34	16.86696046	76	30	23	22.25693346
73	59	7	32.20769486	75	9	33	17.27816067	76	32	22	22.79964913
73	61	6	33.03413344	75	11	32	17.69993446	76	34	21	23.35611796
73	63	5	33.88237286	75	13	31	18.13255074	76	36	20	23.92668814

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
76	38	19	24.51171682	77	61	8	32.21004947	79	3	38	16.23999190
76	40	18	25.11157037	77	63	7	32.99506354	79	5	37	16.61598792
76	42	17	25.72662465	77	65	6	33.79973115	79	7	36	17.00117843
76	44	16	26.35726519	77	67	5	34.62454632	79	9	35	17.39578525
76	46	15	27.00388747	77	69	4	35.47001561	79	11	34	17.80003581
76	48	14	27.66689717	77	71	3	36.33665847	79	13	33	18.21416322
76	50	13	28.34671043	77	73	2	37.22500754	79	15	32	18.63840648
76	52	12	29.04375413	77	75	1	38.13560897	79	17	31	19.07301056
76	54	11	29.75846611	77	77	0	39.06902282	79	19	30	19.51822658
76	56	10	30.49129553	78	0	39	15.64762677	79	21	29	19.97431194
76	58	9	31.24270311	78	2	38	16.01354050	79	23	28	20.44153048
76	60	8	32.01316141	78	4	37	16.38851961	79	25	27	20.92015262
76	62	7	32.80315520	78	6	36	16.77278517	79	27	26	21.41045554
76	64	6	33.61318170	78	8	35	17.16656388	79	29	25	21.91272332
76	66	5	34.44375094	78	10	34	17.57008825	79	31	24	22.42724712
76	68	4	35.29538608	78	12	33	17.98359671	79	33	23	22.95432537
76	70	3	36.16862374	78	14	32	18.40733375	79	35	22	23.49426391
76	72	2	37.06401437	78	16	31	18.84155008	79	37	21	24.04737619
76	74	1	37.98212258	78	18	30	19.28650277	79	39	20	24.61398346
76	76	0	38.92352748	78	20	29	19.74245542	79	41	19	25.19441495
77	1	38	15.78518286	78	22	28	20.20967830	79	43	18	25.78900808
77	3	37	16.15996887	78	24	27	20.68844850	79	45	17	26.39810862
77	5	36	16.54233385	78	26	26	21.17905015	79	47	16	27.02207097
77	7	35	16.93520955	78	28	25	21.68177452	79	49	15	27.66125829
77	9	34	17.33793368	78	30	24	22.19692026	79	51	14	28.31604277
77	11	33	17.75075012	78	32	23	22.72479355	79	53	13	28.98680581
77	13	32	18.17390903	78	34	22	23.26570828	79	55	12	29.67393830
77	15	31	18.60766701	78	36	21	23.81998625	79	57	11	30.37784080
77	17	30	19.05229728	78	38	20	24.38795738	79	59	10	31.09892381
77	19	29	19.50803979	78	40	19	24.96995986	79	61	9	31.83760801
77	21	28	19.97520145	78	42	18	25.56634044	79	63	8	32.59432449
77	23	27	20.45405625	78	44	17	26.17745455	79	65	7	33.36951505
77	25	26	20.94489547	78	46	16	26.80366657	79	67	6	34.16363240
77	27	25	21.44801782	78	48	15	27.44535005	79	69	5	34.97714051
77	29	24	21.96372968	78	50	14	28.10288790	79	71	4	35.81051480
77	31	23	22.49234524	78	52	13	28.77667269	79	73	3	36.66424251
77	33	22	23.03418673	78	54	12	29.46710682	79	75	2	37.53882291
77	35	21	23.58958458	78	56	11	30.17460279	79	77	1	38.43476768
77	37	20	24.15887767	78	58	10	30.89958349	79	79	0	39.35260112
77	39	19	24.74241352	78	60	9	31.64248239	80	0	40	15.73712556
77	41	18	25.34854851	78	62	8	32.40374387	80	2	39	16.09648910
77	43	17	25.95364809	78	64	7	33.18382343	80	4	38	16.46453739
77	45	16	26.58208702	78	66	6	33.98318804	80	6	37	16.84147706
77	47	15	27.22624961	78	68	5	34.80231634	80	8	36	17.22751990
77	49	14	27.88652995	78	70	4	35.64169903	80	10	35	17.62288296
77	51	13	28.56333214	78	72	3	36.50183907	80	12	34	18.02778869
77	53	12	29.25707059	78	74	2	37.38325208	80	14	33	18.44246508
77	55	11	29.96817024	78	76	1	38.28646658	80	16	32	18.86714575
77	57	10	30.69706683	78	78	0	39.21202437	80	18	31	19.30207011
77	59	9	31.44420718	79	1	39	15.87297401	80	20	30	19.74748349

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
80	22	29	20.20363728	81	41	20	25.05709486	82	58	12	30.27592688
80	24	28	20.67078908	81	43	19	25.63428227	82	60	11	30.96912360
80	26	27	21.14920283	81	45	18	26.22521177	82	62	10	31.67863368
80	28	26	21.63914899	81	47	17	26.83021084	82	64	9	32.40484227
80	30	25	22.14990466	81	49	16	27.44961492	82	66	8	33.14814372
80	32	24	22.65475377	81	51	15	28.08376755	82	68	7	33.90894180
80	34	23	23.18098724	81	53	14	28.73302060	82	70	6	34.68764991
80	36	22	23.71990313	81	55	13	29.39773444	82	72	5	35.48469134
80	38	21	24.27180682	81	57	12	30.07827816	82	74	4	36.30049947
80	40	20	24.83701118	81	59	11	30.77502980	82	76	3	37.13551805
80	42	19	25.41583679	81	61	10	31.48837653	82	78	2	37.99020139
80	44	18	26.00861206	81	63	9	32.21871486	82	80	1	38.86501468
80	46	17	26.61567348	81	65	8	32.96645091	82	82	0	39.76043418
80	48	16	27.23736577	81	67	7	33.73200063	83	1	41	16.03972388
80	50	15	27.87404211	81	69	6	34.51578999	83	3	40	16.39375681
80	52	14	28.52606435	81	71	5	35.31825529	83	5	39	16.75604070
80	54	13	29.19380317	81	73	4	36.13984336	83	7	38	17.12676505
80	56	12	29.87763835	81	75	3	36.98101182	83	9	37	17.50612393
80	58	11	30.57795898	81	77	2	37.84222936	83	11	36	17.89431605
80	60	10	31.29516365	81	79	1	38.72397599	83	13	35	18.29154491
80	62	9	32.02966074	81	81	0	39.62674334	83	15	34	18.69801884
80	64	8	32.78186860	82	0	41	15.82359399	83	17	33	19.11395118
80	66	7	33.55221583	82	2	40	16.17664353	83	19	32	19.53956032
80	68	6	34.34114152	82	4	39	16.53802101	83	21	31	19.97506990
80	70	5	35.14969549	82	6	38	16.90791989	83	23	30	20.42070884
80	72	4	35.97653859	82	8	37	17.28653833	83	25	29	20.87671156
80	74	3	36.82394294	82	10	36	17.67407927	83	27	28	21.34331800
80	76	2	37.69179218	82	12	35	18.07075062	83	29	27	21.82077383
80	78	1	38.58958183	82	14	34	18.47676530	83	31	26	22.30933054
80	80	0	39.49801949	82	16	33	18.89234138	83	33	25	22.80924560
81	1	40	15.95776631	82	18	32	19.31770221	83	35	24	23.32078256
81	3	39	16.31817120	82	20	31	19.75307652	83	37	23	23.84421125
81	5	38	16.68717893	82	22	30	20.19869857	83	39	22	24.37980785
81	7	37	17.06499183	82	24	29	20.65480823	83	41	21	24.92785512
81	9	36	17.45181722	82	26	28	21.12165119	83	43	20	25.48864248
81	11	35	17.84786753	82	28	27	21.59947900	83	45	19	26.06246621
81	13	34	18.25336037	82	30	26	22.08854929	83	47	18	26.64962960
81	15	33	18.66851870	82	32	25	22.58912587	83	49	17	27.25044311
81	17	32	19.09357095	82	34	24	23.10147887	83	51	16	27.86522452
81	19	31	19.52875110	82	36	23	23.62588491	83	53	15	28.49429914
81	21	30	19.97429887	82	38	22	24.16262723	83	55	14	29.13799996
81	23	29	20.43045980	82	40	21	24.71199588	83	57	13	29.79666783
81	25	28	20.89748545	82	42	20	25.27428783	83	59	12	30.47065166
81	27	27	21.37563348	82	44	19	25.84980719	83	61	11	31.16030859
81	29	26	21.86516782	82	46	18	26.43886532	83	63	10	31.86600417
81	31	25	22.36635882	82	48	17	27.04178107	83	65	9	32.58811263
81	33	24	22.87948342	82	50	16	27.65888086	83	67	8	33.32701698
81	35	23	23.40482524	82	52	15	28.29049898	83	69	7	34.08310930
81	37	22	23.94267483	82	54	14	28.93697767	83	71	6	34.85679091
81	39	21	24.49332977	82	56	13	29.59866737	83	73	5	35.64847260

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
83	75	4	36.45857485	85	5	40	16.82269704	86	18	34	19.34903633
83	77	3	37.28752807	85	7	39	17.18660486	86	20	33	19.76569386
83	79	2	38.13577281	85	9	38	17.55879292	86	22	32	20.19171183
83	81	1	39.00376001	85	11	37	17.93944739	86	24	31	20.62729936
83	83	0	39.89195126	85	13	36	18.32875884	86	26	30	21.07267036
84	0	42	15.90719593	85	15	35	18.72692225	86	28	29	21.52804364
84	2	41	16.25415506	85	17	34	19.13413716	86	30	28	21.99364305
84	4	40	16.60910721	85	19	33	19.55060778	86	32	27	22.46969754
84	6	39	16.97223375	85	21	32	19.97654306	86	34	26	22.95644132
84	8	38	17.34372036	85	23	31	20.41215680	86	36	25	23.45411397
84	10	37	17.72375711	85	25	30	20.85766778	86	38	24	23.96296054
84	12	36	18.11253859	85	27	29	21.31329987	86	40	23	24.48323168
84	14	35	18.51026398	85	29	28	21.77928211	86	42	22	25.01518378
84	16	34	18.91713717	85	31	27	22.25584887	86	44	21	25.55907908
84	18	33	19.33336686	85	33	26	22.74323994	86	46	20	26.11518580
84	20	32	19.75916665	85	35	25	23.24170068	86	48	19	26.68377832
84	22	31	20.19475520	85	37	24	23.75148212	86	50	18	27.26513724
84	24	30	20.64035630	85	39	23	24.27284110	86	52	17	27.85954960
84	26	29	21.09619898	85	41	22	24.80604038	86	54	16	28.46730896
84	28	28	21.56251769	85	43	21	25.35134882	86	56	15	29.08871559
84	30	27	22.03955235	85	45	20	25.90904150	86	58	14	29.72407662
84	32	26	22.52754851	85	47	19	26.47939982	86	60	13	30.37370615
84	34	25	23.02675748	85	49	18	27.06271172	86	62	12	31.03792546
84	36	24	23.53743647	85	51	17	27.65927174	86	64	11	31.71706317
84	38	23	24.05984870	85	53	16	28.26938127	86	66	10	32.41145536
84	40	22	24.59426353	85	55	15	28.89334862	86	68	9	33.12144578
84	42	21	25.14195666	85	57	14	29.53148923	86	70	8	33.84738601
84	44	20	25.70321022	85	59	13	30.18412579	86	72	7	34.58963565
84	46	19	26.27231293	85	61	12	30.85158848	86	74	6	35.34856249
84	48	18	26.85756025	85	63	11	31.53421505	86	76	5	36.12454267
84	50	17	27.45625457	85	65	10	32.23235105	86	78	4	36.91796095
84	52	16	28.06870532	85	67	9	32.94635002	86	80	3	37.72921080
84	54	15	28.69522916	85	69	8	33.67657360	86	82	2	38.55869468
84	56	14	29.33615014	85	71	7	34.42339182	86	84	1	39.40682422
84	58	13	29.99170988	85	73	6	35.18718319	86	86	0	40.27402040
84	60	12	30.6625774	85	75	5	35.96833499	87	1	43	16.19573111
84	62	11	31.34860098	85	77	4	36.76724337	87	3	42	16.53769196
84	64	10	32.05250499	85	79	3	37.58431366	87	5	41	16.88726271
84	66	9	32.76859342	85	81	2	38.41996048	87	7	40	17.24461032
84	68	8	33.50313842	85	83	1	39.27460806	87	9	39	17.60990558
84	70	7	34.25457082	85	85	0	40.14869034	87	11	38	17.98332319
84	72	6	35.02328031	86	0	43	15.98808320	87	13	37	18.36504185
84	74	5	35.80966570	86	2	42	16.32916379	87	15	36	18.75524432
84	76	4	36.61413505	86	4	41	16.67792259	87	17	35	19.15411755
84	78	3	37.43710599	86	6	40	17.03452986	87	19	34	19.56185274
84	80	2	38.27960563	86	8	39	17.39915986	87	21	33	19.97464543
84	82	1	39.14627189	86	10	38	17.77199085	87	23	32	20.40469561
84	84	0	40.02135164	86	12	37	18.15320521	87	25	31	20.84020782
85	1	42	16.11899856	86	14	36	18.54298957	87	27	30	21.28539125
85	3	41	16.46688753	86	16	35	18.94153484	87	29	29	21.74045981

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
87	31	28	22.20563226	88	42	23	24.89637723	89	53	18	27.85657319
87	33	27	22.68113235	88	44	22	25.42574811	89	55	17	28.44447801
87	35	26	23.16718885	88	46	21	25.96673950	89	57	16	29.04514780
87	37	25	23.66403573	88	48	20	26.51960664	89	59	15	29.65886029
87	39	24	24.17191225	88	50	19	27.08461043	89	61	14	30.28589932
87	41	23	24.69106307	88	52	18	27.66201762	89	63	13	30.92655500
87	43	22	25.22173838	88	54	17	28.25210090	89	65	12	31.58112383
87	45	21	25.76419404	88	56	16	28.85513902	89	67	11	32.24990882
87	47	20	26.31869166	88	58	15	29.47141698	89	69	10	32.93321969
87	49	19	26.88549876	88	60	14	30.10122611	89	71	9	33.63137295
87	51	18	27.46488891	88	62	13	30.74486423	89	73	8	34.34469210
87	53	17	28.05714184	88	64	12	31.40263581	89	75	7	35.07350776
87	55	16	28.66254359	88	66	11	32.07485209	89	77	6	35.81815783
87	57	15	29.28138667	88	68	10	32.76183127	89	79	5	36.57898764
87	59	14	29.91397014	88	70	9	33.46389860	89	81	4	37.35635015
87	61	13	30.56059986	88	72	8	34.18138660	89	83	3	38.15060606
87	63	12	31.22158852	88	74	7	34.91463519	89	85	2	38.96212403
87	65	11	31.89725592	88	76	6	35.66399184	89	87	1	39.79128082
87	67	10	32.58792900	88	78	5	36.42981180	89	89	0	40.63846151
87	69	9	33.29394212	88	80	4	37.21245819	90	0	45	16.14226714
87	71	8	34.01563715	88	82	3	38.01230222	90	2	44	16.47218336
87	73	7	34.75336365	88	84	2	38.82972339	90	4	43	16.80920224
87	75	6	35.50747907	88	86	1	39.66510962	90	6	42	17.15347448
87	77	5	36.27834890	88	88	0	40.51885747	90	8	41	17.50515411
87	79	4	37.06634685	89	1	44	16.27005217	90	10	40	17.86439860
87	81	3	37.87185508	89	3	43	16.60628947	90	12	39	18.23136888
87	83	2	38.69526432	89	5	42	16.94984422	90	14	38	18.60622945
87	85	1	39.53697411	89	7	41	17.30087343	90	16	37	18.98914843
87	87	0	40.39739299	89	9	40	17.65953767	90	18	36	19.38029765
88	0	44	16.06639664	89	11	39	18.02600108	90	20	35	19.77985271
88	2	43	16.40179966	89	13	38	18.40043148	90	22	34	20.18799310
88	4	42	16.74458457	89	15	37	18.78300042	90	24	33	20.60490222
88	6	41	17.09491146	89	17	36	19.17388329	90	26	32	21.03076752
88	8	40	17.45294406	89	19	35	19.57325937	90	28	31	21.46578056
88	10	39	17.81884978	89	21	34	19.98131195	90	30	30	21.91013710
88	12	38	18.19279985	89	23	33	20.39822838	90	32	29	22.36403717
88	14	37	18.57496934	89	25	32	20.82420017	90	34	28	22.82768522
88	16	36	18.96593729	89	27	31	21.25942309	90	36	27	23.30129014
88	18	35	19.36408677	89	29	30	21.70409725	90	38	26	23.78506540
88	20	34	19.77290495	89	31	29	22.15842717	90	40	25	24.27922915
88	22	33	20.18948324	89	33	28	22.62262194	90	42	24	24.78400429
88	24	32	20.61551733	89	35	27	23.09689525	90	44	23	25.29961860
88	26	31	21.05090731	89	37	26	23.58146553	90	46	22	25.82630483
88	28	30	21.49585776	89	39	25	24.07655603	90	48	21	26.36430083
88	30	29	21.95057784	89	41	24	24.58239495	90	50	20	26.91384961
88	32	28	22.41528140	89	43	23	25.09921551	90	52	19	27.47519951
88	34	27	22.89918707	89	45	22	25.62725612	90	54	18	28.04860427
88	36	26	23.37551840	89	47	21	26.16676040	90	56	17	28.63432318
88	38	25	23.87150391	89	49	20	26.71797739	90	58	16	29.23262118
88	40	24	24.37837723	89	51	19	27.28116161	90	60	15	29.84376897

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET 2*F2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
90	62	14	30.46804317	91	71	10	33.26867670	92	78	7	35.53628009
90	64	13	31.10572642	91	73	9	33.95909760	92	80	6	36.26711825
90	66	12	31.75710753	91	75	8	34.66419339	92	82	5	37.01332834
90	68	11	32.42248157	91	77	7	35.38427708	92	84	4	37.77523496
90	70	10	33.10215009	91	79	6	36.11966842	92	86	3	38.55316958
90	72	9	33.79642117	91	81	5	36.87069408	92	88	2	39.34747079
90	74	8	34.50560961	91	83	4	37.63768773	92	90	1	40.15848434
90	76	7	35.23003707	91	85	3	38.42099025	92	92	0	40.98656338
90	78	6	35.97003220	91	87	2	39.22094984	93	1	46	16.41193748
90	80	5	36.72593084	91	89	1	40.03792222	93	3	45	16.73730002
90	82	4	37.49807612	91	91	0	40.87227077	93	5	44	17.06944417
90	84	3	38.28681863	92	0	46	16.21581650	93	7	43	17.40850938
90	86	2	39.09251661	92	2	45	16.54042720	93	9	42	17.75463806
90	88	1	39.91553611	92	4	44	16.87187708	93	11	41	18.10797569
90	90	0	40.75625113	92	6	43	17.21030820	93	13	40	18.46867085
91	1	45	16.34208326	92	8	42	17.55586567	93	15	39	18.83687532
91	3	44	16.67279105	92	10	41	17.90869776	93	17	38	19.21274409
91	5	43	17.01054062	92	12	40	18.26895595	93	19	37	19.59643546
91	7	42	17.35547985	92	14	39	18.63679498	93	21	36	19.98811113
91	9	41	17.70775985	92	16	38	19.01237294	93	23	35	20.38793622
91	11	40	18.06753505	92	18	37	19.39585134	93	25	34	20.79607935
91	13	39	18.43496327	92	20	36	19.78739515	93	27	33	21.21271274
91	15	38	18.81020575	92	22	35	20.18717290	93	29	32	21.63801227
91	17	37	19.19342727	92	24	34	20.59535675	93	31	31	22.07215755
91	19	36	19.58479619	92	26	33	21.01212254	93	33	30	22.51533199
91	21	35	19.98448453	92	28	32	21.43764991	93	35	29	22.96772290
91	23	34	20.39266805	92	30	31	21.87212233	93	37	28	23.42952154
91	25	33	20.80952634	92	32	30	22.31572722	93	39	27	23.90092325
91	27	32	21.23524289	92	34	29	22.76865602	93	41	26	24.38212748
91	29	31	21.67000515	92	36	28	23.23110425	93	43	25	24.87333792
91	31	30	22.11400466	92	38	27	23.70327165	93	45	24	25.37476253
91	33	29	22.56743709	92	40	26	24.18536219	93	47	23	25.88661372
91	35	28	23.03050236	92	42	25	24.67758424	93	49	22	26.40910835
91	37	27	23.50340472	92	44	24	25.18015061	93	51	21	26.94246788
91	39	26	23.98635282	92	46	23	25.69327865	93	53	20	27.48691844
91	41	25	24.47955985	92	48	22	26.21719038	93	55	19	28.04269095
91	43	24	24.98324359	92	50	21	26.75211253	93	57	18	28.61002119
91	45	23	25.49762652	92	52	20	27.29827671	93	59	17	29.18914993
91	47	22	26.02293594	92	54	19	27.85591943	93	61	16	29.78032300
91	49	21	26.55940406	92	56	18	28.42528228	93	63	15	30.38379145
91	51	20	27.10726809	92	58	17	29.00561200	93	65	14	30.99981160
91	53	19	27.66677037	92	60	16	29.60016058	93	67	13	31.62864519
91	55	18	28.23815847	92	62	15	30.20618541	93	69	12	32.27055948
91	57	17	28.82168528	92	64	14	30.82494934	93	71	11	32.92582737
91	59	16	29.41760918	92	66	13	31.45672085	93	73	10	33.59472751
91	61	15	30.02619409	92	68	12	32.10177413	93	75	9	34.27754443
91	63	14	30.64770964	92	70	11	32.76038922	93	77	8	34.97456864
91	65	13	31.28243125	92	72	10	33.43285213	93	79	7	35.68609681
91	67	12	31.93004032	92	74	9	34.11945497	93	81	6	36.41243184
91	69	11	32.59262425	92	76	8	34.82049606	93	83	5	37.15388302

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
93	85	4	37.91076616	94	90	2	39.59495649	95	95	0	41.31948744
93	87	3	38.68340373	94	92	1	40.39430988	96	0	48	16.35639838
93	89	2	39.47212499	94	94	0	41.21013223	96	2	47	16.67090680
93	91	1	40.27726614	95	1	47	16.47972033	96	4	46	16.99177021
93	93	0	41.09917049	95	3	46	16.79991270	96	6	45	17.31911524
94	0	47	16.28715827	95	5	45	17.12664089	96	8	44	17.65307114
94	2	46	16.60663580	95	7	44	17.46003653	96	10	43	17.99376987
94	4	45	16.93270366	95	9	43	17.80023400	96	12	42	18.34134610
94	6	44	17.26549588	95	11	42	18.14737050	96	14	41	18.69593730
94	8	43	17.60514935	95	13	41	18.50158611	96	16	40	19.05768380
94	10	42	17.95180384	95	15	40	18.86302385	96	18	39	19.42672880
94	12	41	18.30560211	95	17	39	19.23182972	96	20	38	19.80321850
94	14	40	18.66668993	95	19	38	19.60815275	96	22	37	20.18730207
94	16	39	19.03521613	95	21	37	19.99214511	96	24	36	20.57913179
94	18	38	19.41133271	95	23	36	20.38396214	96	26	35	20.97886307
94	20	37	19.79519487	95	25	35	20.78376238	96	28	34	21.38665452
94	22	36	20.18696106	95	27	34	21.19170770	96	30	33	21.80266800
94	24	35	20.58679310	95	29	33	21.60796334	96	32	32	22.22706870
94	26	34	20.99485617	95	31	32	22.03269795	96	34	31	22.66002524
94	28	33	21.41131897	95	33	31	22.46608371	96	36	30	23.10170965
94	30	32	21.83635371	95	35	30	22.90829634	96	38	29	23.55229753
94	32	31	22.27013623	95	37	29	23.35951525	96	40	28	24.01196808
94	34	30	22.71284605	95	39	28	23.81992352	96	42	27	24.48090415
94	36	29	23.16466647	95	41	27	24.28970807	96	44	26	24.95929237
94	38	28	23.62578461	95	43	26	24.76905967	96	46	25	25.44732317
94	40	27	24.09639152	95	45	25	25.25817304	96	48	24	25.94519091
94	42	26	24.57668227	95	47	24	25.75724695	96	50	23	26.45309390
94	44	25	25.06685599	95	49	23	26.26648426	96	52	22	26.97123453
94	46	24	25.56711597	95	51	22	26.78609204	96	54	21	27.49981933
94	48	23	26.07766979	95	53	21	27.31628165	96	56	20	28.03905906
94	50	22	26.59872932	95	55	20	27.85726881	96	58	19	28.58916878
94	52	21	27.13051091	95	57	19	28.40927371	96	60	18	29.15036796
94	54	20	27.67323540	95	59	18	28.97252108	96	62	17	29.72288057
94	56	19	28.22712825	95	61	17	29.54724030	96	64	16	30.30693513
94	58	18	28.79241964	95	63	16	30.13366551	96	66	15	30.90276487
94	60	17	29.36934455	95	65	15	30.73203565	96	68	14	31.51060776
94	62	16	29.95814287	95	67	14	31.34259462	96	70	13	32.13070664
94	64	15	30.55905049	95	69	13	31.96559136	96	72	12	32.76330933
94	66	14	31.17234443	95	71	12	32.60127994	96	74	11	33.40866869
94	68	13	31.79825291	95	73	11	33.24991969	96	76	10	34.06704277
94	70	12	32.43704549	95	75	10	33.91177528	96	78	9	34.73869487
94	72	11	33.08898817	95	77	9	34.58711685	96	80	8	35.42389369
94	74	10	33.75435249	95	79	8	35.27622013	96	82	7	36.12291342
94	76	9	34.43341565	95	81	7	35.97936652	96	84	6	36.83603384
94	78	8	35.12646066	95	83	6	36.69584324	96	86	5	37.56354044
94	80	7	35.83377640	95	85	5	37.42894344	96	88	4	38.30572455
94	82	6	36.55565780	95	87	4	38.17596632	96	90	3	39.06288347
94	84	5	37.29240594	95	89	3	38.93821726	96	92	2	39.83532054
94	86	4	38.04432817	95	91	2	39.71600792	96	94	1	40.62334532
94	88	3	38.81173425	95	93	1	40.50965642	96	96	0	41.42727367

TABLE 4 DEGRES JUSQU'A 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION	N	R1	R2	MINORATION	N	R1	R2	MINORATION
97	1	48	16.54553030	98	2	48	16.73333139	99	3	48	16.91980313
97	3	47	16.86071904	98	4	47	17.04915917	99	5	47	17.23622997
97	5	46	17.18221111	98	6	46	17.37123891	99	7	46	17.55885771
97	7	45	17.51013092	98	8	45	17.69969282	99	9	45	17.88780641
97	9	44	17.84460540	98	10	44	18.03464558	99	11	44	18.22319852
97	11	43	18.18576411	98	12	43	18.37622441	99	13	43	18.56515898
97	13	42	18.53373926	98	14	42	18.72455912	99	15	42	18.91381523
97	15	41	18.88866579	98	16	41	19.07978212	99	17	41	19.26929727
97	17	40	19.25068136	98	18	40	19.44202855	99	19	40	19.63173770
97	19	39	19.61992650	98	20	39	19.81143624	99	21	39	20.00127178
97	21	38	19.99654456	98	22	38	20.18814584	99	23	38	20.37803747
97	23	37	20.38668186	98	24	37	20.57230083	99	25	37	20.76217551
97	25	36	20.77248767	98	26	36	20.96404757	99	27	36	21.15382943
97	27	35	21.17211433	98	28	35	21.36353541	99	29	35	21.55314563
97	29	34	21.57971727	98	30	34	21.77091667	99	31	34	21.96027343
97	31	33	21.99545509	98	32	33	22.18634677	99	33	33	22.37536513
97	33	32	22.41948961	98	34	32	22.60998424	99	35	32	22.79857608
97	35	31	22.85198594	98	36	31	23.04199082	99	37	31	23.23006470
97	37	30	23.29311257	98	38	30	23.48253148	99	39	30	23.66999258
97	39	29	23.74304137	98	40	29	23.93177453	99	41	29	24.11852452
97	41	28	24.26194774	98	42	28	24.38989165	99	43	28	24.57582860
97	43	27	24.67001063	98	44	27	24.85705797	99	45	27	25.04207625
97	45	26	25.14741260	98	46	26	25.33345214	99	47	26	25.51744230
97	47	25	25.63433994	98	48	25	25.81925639	99	49	25	26.00210506
97	49	24	26.13098271	98	50	24	26.31465663	99	51	24	26.49624637
97	51	23	26.63753481	98	52	23	26.81984247	99	53	23	27.00005170
97	53	22	27.15419410	98	54	22	27.33500735	99	55	22	27.51371019
97	55	21	27.68116240	98	56	21	27.86034856	99	57	21	28.03741475
97	57	20	28.21864567	98	58	20	28.39606738	99	59	20	28.57136209
97	59	19	28.76685402	98	60	19	28.94236911	99	61	19	29.11575287
97	61	18	29.32600180	98	62	18	29.49946315	99	63	18	29.67079168
97	63	17	29.89630771	98	64	17	30.06756312	99	65	17	30.23668720
97	65	16	30.47799490	98	66	16	30.64688691	99	67	16	30.81365225
97	67	15	31.07129100	98	68	15	31.23765676	99	69	15	31.40190385
97	69	14	31.67642826	98	70	14	31.84009940	99	71	14	32.00166335
97	71	13	32.29364364	98	72	13	32.45444606	99	73	13	32.61315647
97	73	12	32.92317888	98	74	12	33.08093263	99	75	12	33.23661341
97	75	11	33.56529062	98	76	11	33.71979970	99	77	11	33.87226894
97	77	10	34.22620048	98	78	10	34.37129270	99	79	10	34.52036247
97	79	9	34.88819518	98	80	9	35.03566196	99	81	9	35.18113816
97	81	8	35.56952661	98	82	8	35.71316282	99	83	8	35.85484501
97	83	7	36.26446198	98	84	7	36.40405574	99	85	7	36.54173697
97	85	6	36.97327389	98	86	6	37.10860638	99	87	6	37.24207299
97	87	5	37.69624046	98	88	5	37.82708573	99	89	5	37.95611718
97	89	4	38.43364543	98	90	4	38.55977021	99	91	4	38.68413887
97	91	3	39.18577827	98	92	3	39.30694174	99	93	3	39.42641273
97	93	2	39.95293431	98	94	2	40.06888792	99	95	2	40.18321887
97	95	1	40.73541485	98	96	1	40.84590209	99	97	1	40.95484295
97	97	0	41.53352727	98	98	0	41.63828345	99	99	0	41.74157628
98	0	49	16.42363584	99	1	49	16.60945951	100	0	50	16.48896330

TABLE 4 DEGRÉS JUSQU'À 100 (R1 CONJUGUES REELS ET 2*R2 CONJUGUES IMAGINAIRES)

N	R1	R2	MINORATION
100	2	49	16.79399493
100	4	48	17.10494767
100	6	47	17.42193490
100	8	46	17.74507226
100	10	45	18.07447771
100	12	44	18.41027154
100	14	43	18.75257645
100	16	42	19.10151758
100	18	41	19.45722253
100	20	40	19.81982146
100	22	39	20.18944710
100	24	38	20.56623480
100	26	37	20.95032261
100	28	36	21.34185128
100	30	35	21.74096437
100	32	34	22.14780826
100	34	33	22.56253222
100	36	32	22.98528848
100	38	31	23.41623224
100	40	30	23.85552180
100	42	29	24.30331854
100	44	28	24.75978705
100	46	27	25.22569515
100	48	26	25.69941395
100	50	25	26.18291795
100	52	24	26.67578506
100	54	23	27.17819670
100	56	22	27.69633786
100	58	21	28.21239716
100	60	20	28.74456692
100	62	19	29.28704326
100	64	18	29.84002613
100	66	17	30.40371943
100	68	16	30.97833103
100	70	15	31.56457292
100	72	14	32.16116123
100	74	13	32.76981634
100	76	12	33.39026295
100	78	11	34.02273017
100	80	10	34.66745162
100	82	9	35.32466548
100	84	8	35.99461464
100	86	7	36.67754671
100	88	6	37.37371419
100	90	5	38.08337453
100	92	4	38.80679022
100	94	3	39.54422291
100	96	2	40.29596349
100	98	1	41.06227221
100	100	0	41.84343878

