

## Longitud: unidades

## UNIDADES

1 metro (m) = 10 decímetros (dm) = 100 centímetros (cm) = 1000 milímetros (mm)

1 kilómetro (km) = 1000 metros (m)

1 milla marina = 1852 m (milla náutica)

1 cable = 185 m

1 braza = 1,83 m

### Correspondencia en unidades anglo-americanas ▶

• 1 mm	= 0,04 pulgadas (in) o (")
1 cm	= 0,4 pulgadas (in) o (")
1 cm	= 0,03 pies (ft) o (')
1 m	= 3,3 pies (ft) o (')
1 m	= 1,09 yardas (yd)
1 m	= 0,55 brazas (fm)
1 km	= 0,54 millas náuticas (m)
1 km	= 0,62 millas terrestres
• 1 pulgada (in)	= 25,4 mm
1 pulgada (in)	= 2,54 cm
1 pie (ft)	= 30,5 cm
1 pie (ft)	= 0,3 m
1 yarda (yd)	= 0,9 m
1 braza (fm)	= 1,83 m
1 milla náutica	= 1,85 km
1 milla terrestre	= 1609 m

### Aproximaciones de cálculo rápido ▶

10	cm	~	4	pulgadas
30	cm	~	1	pie
1	m	~	40	pulgadas



## Superficie: unidades

### UNIDADES

1 metro cuadrado ( $m^2$ ) = 100 decímetros cuadrados ( $dm^2$ ) = 10000 centímetros cuadrados ( $cm^2$ ) = 1000 000 milímetros cuadrados ( $mm^2$ )

1 kilómetro cuadrado ( $km^2$ ) = 1000 000  $m^2$

1 área (a) = 100  $m^2$

1 hectárea (ha) = 10000  $m^2$

• 1  $mm^2$  = 0,0015 *pulgadas cuadradas* ( $in^2$ )

1  $cm^2$  = **0,15** *pulgadas cuadradas* ( $in^2$ )

1  $m^2$  = 10,7 *pies cuadrados* ( $ft^2$ )

1 ha = 2,47 *acres*

• 1 *pulgada a cuadrada* ( $in^2$ ) = 645  $mm^2$

1 *pulgada a cuadrada* ( $in^2$ ) = 6,45  $cm^2$

1 *pie cuadrado* ( $ft^2$ ) = 0,09  $m^2$

1 *acre* = **0,4 ha**

◀ **Correspondencia en unidades anglo-americanas**

10  $cm^2$  ~ 1,5 ( $in^2$ ) *pulgadas cuadradas*

1  $dm^2$  ~ 15 ( $in^2$ ) *pulgadas cuadradas*

1  $m^2$  ~ 11 ( $ft^2$ ) *pies cuadrados*

10  $m^2$  ~ 12 ( $yd^2$ ) *yardas cuadradas*

◀ **Aproximaciones de cálculo rápido**



## Volumen, capacidad: unidades

1 metro cúbico ( $m^3$ ) = 1000 decímetros cúbicos ( $dm^3$ ) = 1000000 centímetros cúbicos ( $cm^3$ )

1 litro (l) = 1000 centímetros cúbicos ( $cm^3$ ) = 1 decímetro cúbico ( $dm^3$ )

1 metro cúbico ( $m^3$ ) = 1000 litros (l)

### Correspondencia en unidades angloamericanas ▶

• 1 $cm^3$	= 0,06 <i>pulgadas cúbicas</i> ( $in^3$ )
1 $dm^3$	= 0,03 <i>pies cúbicos</i> ( $ft^3$ )
1 $m^3$	= 35,3 <i>pies cúbicos</i> ( $ft^3$ )
1 $m^3$	= 1,3 $yd^3$
1 l	= 0,22 <i>galones imperiales</i> ( <i>imp. gal</i> )
1 l	= 0,26 <i>galones americanos</i> ( <i>US gal</i> )
1 l	= 1,75 <i>pintas inglesas</i> ( <i>pint</i> )
1 l	= 2,1 <i>pintas americanas</i> ( <i>pint</i> )
• 1 <i>pulgada cúbica</i> ( $in^3$ )	= 16,4 $cm^3$
1 <i>pie cúbico</i> ( $ft^3$ )	= 28,3 $dm^3$
1 <i>pie</i> ( $ft^3$ )	= 0,03 $m^3$
1 $yd^3$	= 0,76 $m^3$
1 <i>imp. gal</i>	= 4,5 l
1 <i>US gal</i>	= 3,8 l
1 <i>pinta inglesa</i>	= 0,57 l
1 <i>pinta americana</i>	= 0,47 l

### Aproximaciones de cálculo rápido ▶

9	~	2 gal
1 $m^3$	~	35 $ft^3$



## Peso, masa, fuerza: unidades

### UNIDADES

#### ■ Peso, masa

1 kilogramo (kg) = 1000 gramos (g)

1 tonelada (tm) = 1000 kilogramos (kg)

• 1 g	= 0,03 onzas (oz)
1 kg	= 2,2 libras (lb)
1 kg	= 0,02 quintales (cwt)
1 tm	= 0,98 toneladas largas (t)
• 1 onza	= 28,3 g
1 libra	= 0,45 kg
1 quintal	= 50,8 kg
1 tonelada larga	= 1,01 tm

◀ Correspondencia en unidades anglo-americanas

10 kg	≈	22 libras (lb) 1
50 kg	≈	quintal (cwt)

◀ Aproximaciones de cálculo rápido

#### ■ Fuerza

1 kilogramo fuerza (kgf) = 1000 gramos fuerza (gf)

1 kilogramo fuerza (kgf) = 9,81 newton (N)

1 decanewton (daN) = 10 newton (N)

1 kgf ~ daN

◀ Aproximación



## Velocidad: unidades

1 metro por segundo (m/s)

1 nudo (n) = 1 milla marina\* por hora = 1852 m/hora = 0,51 m/s

### ■ Velocidad de un barco

n	~ m/s	~km/h	n	~m/s	~km/h
0,5	0,3	0,9	8	4,1	14,8
1	0,5	1,8	8,5	4,4	15,7
1,5	0,8	2,8	9	4,6	16,7
2	1,0	3,7	9,5	4,9	17,6
2,5	1,3	4,6	10	5,1	18,5
3	1,5	5,6	10,5	5,4	19,4
3,5	1,8	6,5	11	5,7	20,4
4	2,1	7,4	11,5	5,9	21,3
4,5	2,3	8,3	12	6,2	22,2
5	2,6	9,3	12,5	6,4	23,1
5,5	2,8	10,2	13	6,7	24,1
6	3,1	11,1	13,5	6,9	25
6,5	3,3	12	14	7,2	25,9
7	3,6	13	14,5	7,5	26,9
7,5	3,9	13,9	15	7,7	27,8

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### Por aproximación

$$1) V_{m/s} \sim \frac{V_{nudo}}{2}$$

$$2) V_{km/h} \sim V_{nudo} \times 2 - 10\% (V_n \times 2)$$

$$3) V_{km/h} \sim 1,8 V_{nudo}$$

### Ej.: 10 nudos equivalen a

$$\sim \frac{10}{2} = 5 \text{ m/s}$$

$$\sim \frac{10 \times 2}{20} - \frac{10\% (10 \times 2)}{2} = 18 \text{ km/h}$$

$$\sim 1,8 \times 10 = 18 \text{ km/h}$$

\* Atención: en ciertos países anglosajones las distancias pueden ser medidas en «statute mile» o simplemente «mile» equivalente a 1609 m/hora.

1 «statute mile» = 0,87 millas marinas.



## Presión, potencia, luz, sonido: unidades

## ■ Presión

$$\text{Presión} = \frac{\text{Fuerza (peso)}}{\text{Superficie}}$$

1 atmósfera (Atm) = 1 kgf/cm<sup>2</sup> = 101 kN/m<sup>2</sup> ~ 1 bar ~ 100000 Pascal (Pa) ~ 1013 milibares (mb)

1 milibar (mb) = 100 N/m<sup>2</sup> = 100 Pa

1 kgf/m<sup>2</sup> = 9,81 N/m<sup>2</sup>

1 PSI (pound/square inch) = 689 mb

- 1 kg/mm<sup>2</sup> - 1422 lb/inch<sup>2</sup>
- 1 lb/in<sup>2</sup> = 0,0007 kg/mm<sup>2</sup>

Corresponds en unidades angloes - americanos

## ■ Potencia

Potencia = Fuerza x Velocidad

1 caballo vapor (cv) = 75 kg x m/s

1 kilowatio (kW) = 1,34 caballos vapor en horse power (hp) ingleses

1 caballo (o hp) = 0,74 kW

## ■ Luz

**La intensidad luminosa (I)** se expresa en bujías (o candela, cd)

**El alumbrado (A)** se expresa en lux (lx).

El alumbrado varía en función inversa del cuadrado de la distancia (r) de la fuente luminosa:

$$\text{Alumbrado (lx)} = \frac{\text{Intensidad luminosa (cd)}}{r^2 \text{ (m)}}$$

## ■ Sonido

Velocidad del sonido en el agua: 1500 m/s.



## Temperatura: unidades

°F	°C
-20	-28,9
-10	-23,3
0	-17,8
10	-12,2
20	- 6,7
30	- 1,1
40	4,4
50	10,0
60	15,6
70	24,1
80	26,7
90	32,2
100	37,8
110	43,3
120	48,9
130	54,4
140	60,0
150	65,6
160	71,1
170	76,7
180	27,9
190	87,8
200	93,3
210	98,9

°C	°F
-30	-22
-20	- 4
-10	14
0	32
10	50
20	68
30	86
40	104
50	122
60	140
70	158
80	176
90	194
100	212

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$$^{\circ}\text{C} = \frac{^{\circ}\text{F} - 32}{1,8}$$
$$^{\circ}\text{F} = (^{\circ}\text{C} \times 1,8) + 32$$



Conversión de «kW» en «cv», de «cv» en «kW»

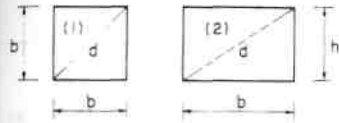
UNIDADES

kW	cv
0,2	0,3
0,4	0,5
0,6	0,8
0,8	1,1
1	1,4
2	2,7
4	5,4
6	8,2
8	10,9
10	14
20	27
30	41
40	54
50	68
60	82
70	95
80	109
90	122
100	136
200	272
300	408
400	544
500	680
600	816
700	952
800	1 088
900	1 224
1 000	1 360
1 100	1 496
1 200	1 632
1 300	1 768
1 400	1 904
1 500	2 040

cv	KW
0,5	0,4
1	0,7
2	1,5
3	2,2
4	2,9
5	3,7
6	4,4
8	5,9
10	7,4
20	15
30	22
40	29
60	44
80	59
100	74
200	147
300	221
400	294
500	368
600	442
700	515
800	589
900	662
1000	736
1200	883
1400	1030
1600	1178
1800	1325
2000	1472

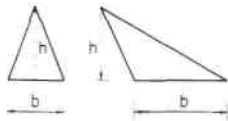
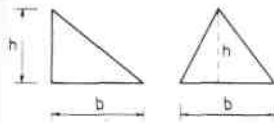


# Superficie

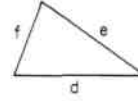


(1) Superficie =  $b \times b = b^2$   
 $(d = b\sqrt{2})$

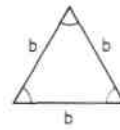
(1) Superficie =  $b \times h$   
 $(d = \sqrt{b^2 + h^2})$



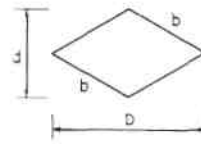
Superficie =  $\frac{b \times h}{2}$



Superficie =  $\sqrt{s(s-d)(s-e)(s-f)}$   
 con  $s = \frac{d+e+f}{2}$

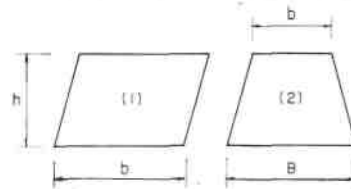


Superficie =  $\frac{b^2\sqrt{3}}{4}$



Superficie =  $\frac{D \times d}{2}$

$D^2 + d^2 = 4b^2$



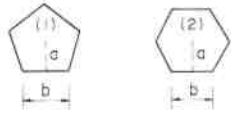
(1) Superficie =  $b \times h$

(2) Superficie =  $\frac{b+B}{2} \times h$

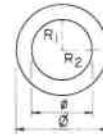


FORMULAS

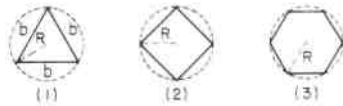
Superficie, perímetro



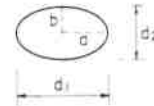
(1), (2) Superficie =  $C \times \frac{a}{2}$   
 $C(1) = 5 \times b$   
 $C(2) = 6 \times b$



Superficie =  $\pi (R_2 - R_1) = \frac{\pi}{2} (\ø - \ø)$



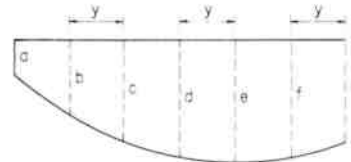
(1) Superficie =  $\frac{3 R^2 \sqrt{3}}{4}$ , ( $c = 3 \times b$ )  
 (2) Superficie =  $2 R^2$   
 (3) Superficie =  $\frac{3 R^2 \sqrt{3}}{2}$



Perímetro =  $\pi [1,5 (a + b) - \sqrt{ab}]$   
 Superficie =  $\frac{\pi}{4} d_1 \times d_2 = \pi a \times b$



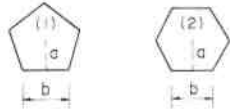
Perímetro =  $2 \pi R = \pi \ø$   
 Superficie =  $\pi R^2 = \frac{\pi \ø^2}{4}$   
 $\pi = 3,14$



Superficie =  
 $= y \left( \frac{a}{2} + b + c + d + e + f + \frac{g}{2} \right)$   
 (fórmula de Simpson)

Superficie, perímetro

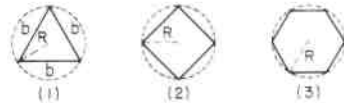
FORMULAS



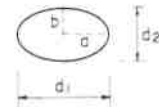
(1), (2) Superficie =  $C \times \frac{a}{2}$   
 $C(1) = 5 \times b$   
 $C(2) = 6 \times b$



Superficie =  $\pi (R_2 - R_1) = \frac{\pi}{2} (\Ø - \ø)$



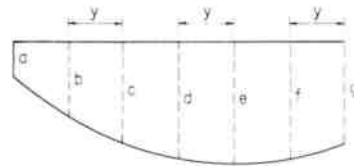
(1) Superficie =  $\frac{3 R^2 \sqrt{3}}{4}$ , ( $c = 3 \times b$ )  
 (2) Superficie =  $2 R^2$   
 (3) Superficie =  $\frac{3 R^2 \sqrt{3}}{2}$



Perímetro =  $\pi [1,5 (a + b) - \sqrt{ab}]$   
 Superficie =  $\frac{\pi}{4} d_1 \times d_2 = \pi a \times b$



Perímetro =  $2 \pi R = \pi \Ø$   
 Superficie =  $\pi R^2 = \frac{\pi \Ø^2}{4}$   
 $\pi = 3,14$

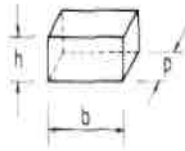


Superficie =  
 $= y \left( \frac{a}{2} + b + c + d + e + f + \frac{g}{2} \right)$   
 (fórmula de Simpson)

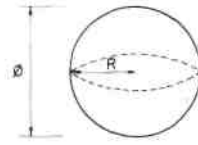


Superficie, volumen

FORMULAS

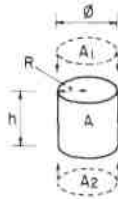


Volumen =  $b \times p \times h$



Superficie =  $4 \pi R^2 = \pi \varnothing^2$

Volumen =  $\frac{4}{3} \pi R^3 = \frac{1}{6} \pi \varnothing^3$

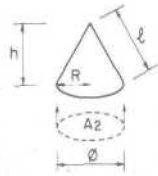


Superficie lateral (A) =  $2 \pi R \times h = \pi \varnothing \times h$

Superficie total ( $A_{tot}$ ) =

$2 \pi R \times (R + h) = (A) + (A_1) + (A_2) = \pi \varnothing \times \left(\frac{\varnothing}{2} + h\right)$

Volumen =  $\pi R^2 \times h = \frac{\pi \varnothing^2}{4} \times h$

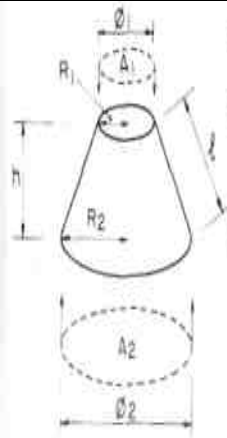


Superficie lateral (A) =  $\pi R \times l = \pi \frac{\varnothing}{2} \times l$

Superficie total ( $A_{tot}$ ) =

$\pi R \times (R + l) = (A) + (A_2) = \pi \frac{\varnothing}{2} \times \left(\frac{\varnothing}{2} + l\right)$

Volumen =  $\frac{1}{3} \pi R^2 \times h = \frac{\pi \varnothing^2 \times h}{12}$



Superficie lateral (A) =  $\pi (R_1 + R_2) \times l$

Superficie total ( $A_{tot}$ ) =

$\pi R_1 (R_1 + l) + \pi R_2 (R_2 + l) = (A) + (A_1) + (A_2)$

Volumen =

$\frac{1}{3} \pi h (R_1^2 + R_1 R_2 + R_2^2) = \frac{\pi h}{12} (\varnothing_1^2 + \varnothing_1 \varnothing_2 + \varnothing_2^2)$



## Presión en el medio marino

FORMULAS

Profundidad (m)	Presión hidrostática (kgf/cm <sup>2</sup> ) o atmósferas
0	1
10	2 o 1 + 1
20	3 o 2 + 1
40	5 o 4 + 1
50	6 o 5 + 1
60	7 o 6 + 1
100	11 o 10 + 1
200	21 o 20 + 1
300	31 o 30 + 1
400	41 o 40 + 1
500	51 o 50 + 1
1000	101 o 100 + 1

(Presión hidrostática)

Presión (kgf/cm<sup>2</sup>) = 0,1 x prof. (m) + 1  
Masa específica del agua ~ 0,001 kgf/cm<sup>3</sup>



## Fuerza de gravedad y empuje vertical

$G_a$  (kgf) = peso del cuerpo en el aire.

$G_a$  (kgf) = volumen del cuerpo ( $m^3$ ) x  $d$  (masa específica del cuerpo en  $kgf/m^3$ ).

$F$  (kgf) = empuje vertical hacia arriba.

$F$  (kgf) = volumen del cuerpo ( $m^3$ ) x  $d_w$  (masa específica del agua en  $kgf/m^3$ ).

$G_w$  (kgf) = peso del cuerpo en el agua.

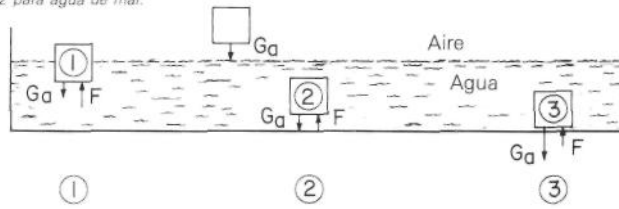
$G_w$  (kgf) = peso del cuerpo en el aire (kgf) — empuje vertical (kgf).

$G_w$  (kgf) =  $G_a - F$

FORMULAS

$$G_w \text{ (kgf)} = G_a \left(1 - \frac{1^*}{d}\right)$$

\* 1 para agua dulce.  
1,02 para agua de mar.



Empuje vertical superior al peso del cuerpo en el aire.

Diferente peso del cuerpo en el aire — empuje vertical negativo.

El cuerpo (1) **flota**.

Empuje vertical igual al peso del cuerpo en el aire.

Diferente peso del cuerpo en el aire — empuje vertical nulo.

El cuerpo (2) está **en equilibrio** en el agua.

Empuje vertical inferior al peso del cuerpo en el

aire.

Diferente peso del cuerpo en el aire — empuje vertical positivo.

El cuerpo (3) **se hunde**.



## Tabla de raíces cuadradas de los números 0 a 499

FORMULAS

N	0	1	2	3	4	5	6	7	8	9
0	0,0000	1,0000	1,4142	1,7321	2,0000	2,2361	2,4495	2,6458	2,8284	3,0000
1	3,1623	3,3166	3,4641	3,6056	3,7417	3,8730	4,0000	4,1231	4,2426	4,3589
2	4,4721	4,5826	4,6904	4,7958	4,8990	5,0000	5,0990	5,1962	5,2915	5,3852
3	5,4772	5,5678	5,6569	5,7446	5,8310	5,9161	6,0000	6,0828	6,1644	6,2450
4	6,3246	6,4031	6,4807	6,5574	6,6332	6,7082	6,7823	6,8557	6,9282	7,0000
5	7,0711	7,1414	7,2111	7,2801	7,3485	7,4162	7,4833	7,5498	7,6158	7,6811
6	7,7460	7,8102	7,8740	7,9373	8,0000	8,0623	8,1240	8,1854	8,2462	8,3066
7	8,3666	8,4261	8,4853	8,5440	8,6023	8,6603	8,7178	8,7750	8,8318	8,8882
8	8,9443	9,0000	9,0554	9,1104	9,1652	9,2195	9,2736	9,3274	9,3808	9,4340
9	9,4868	9,5394	9,5917	9,6437	9,6954	9,7468	9,7980	9,8489	9,8995	9,9499
10	10,0000	10,0499	10,0995	10,1489	10,1980	10,2470	10,2956	10,3441	10,3923	10,4403
11	10,4881	10,5357	10,5830	10,6301	10,6771	10,7238	10,7703	10,8167	10,8628	10,9087
12	10,9545	11,0000	11,0454	11,0905	11,1355	11,1803	11,2250	11,2694	11,3137	11,3578
13	11,4018	11,4455	11,4891	11,5326	11,5758	11,6190	11,6619	11,7047	11,7473	11,7898
14	11,8322	11,8743	11,9164	11,9583	12,0000	12,0416	12,0830	12,1244	12,1655	12,2066
15	12,2474	12,2882	12,3288	12,3693	12,4097	12,4499	12,4900	12,5300	12,5698	12,6095
16	12,6491	12,6886	12,7279	12,7671	12,8062	12,8452	12,8841	12,9228	12,9615	13,0000
17	13,0384	13,0767	13,1149	13,1529	13,1909	13,2288	13,2665	13,3041	13,3417	13,3791
18	13,4164	13,4536	13,4907	13,5277	13,5647	13,6015	13,6382	13,6748	13,7113	13,7477
19	13,7840	13,8203	13,8564	13,8924	13,9284	13,9642	14,0000	14,0357	14,0712	14,1067
20	14,1421	14,1774	14,2127	14,2478	14,2829	14,3178	14,3527	14,3875	14,4222	14,4568
21	14,4914	14,5258	14,5602	14,5945	14,6287	14,6629	14,6969	14,7309	14,7648	14,7986
22	14,8324	14,8661	14,8997	14,9332	14,9666	15,0000	15,0333	15,0665	15,0997	15,1327
23	15,1658	15,1987	15,2315	15,2643	15,2971	15,3297	15,3623	15,3948	15,4272	15,4596
24	15,4919	15,5242	15,5563	15,5885	15,6205	15,6525	15,6844	15,7162	15,7480	15,7797
25	15,8114	15,8430	15,8745	15,9060	15,9374	15,9687	16,0000	16,0312	16,0624	16,0935
26	16,1245	16,1555	16,1864	16,2173	16,2481	16,2788	16,3095	16,3401	16,3707	16,4012
27	16,4317	16,4621	16,4924	16,5227	16,5529	16,5831	16,6132	16,6433	16,6733	16,7033
28	16,7332	16,7631	16,7929	16,8226	16,8523	16,8819	16,9115	16,9411	16,9706	17,0000
29	17,0294	17,0587	17,0880	17,1172	17,1464	17,1756	17,2047	17,2337	17,2627	17,2916
30	17,3205	17,3494	17,3781	17,4069	17,4356	17,4642	17,4929	17,5214	17,5499	17,5784
31	17,6068	17,6352	17,6635	17,6918	17,7200	17,7482	17,7764	17,8045	17,8326	17,8606
32	17,8885	17,9165	17,9444	17,9722	18,0000	18,0278	18,0555	18,0831	18,1108	18,1384
33	18,1659	18,1934	18,2209	18,2483	18,2757	18,3030	18,3303	18,3576	18,3848	18,4120
34	18,4391	18,4662	18,4932	18,5203	18,5472	18,5742	18,6011	18,6279	18,6548	18,6815
35	18,7083	18,7350	18,7617	18,7883	18,8149	18,8414	18,8680	18,8944	18,9209	18,9473
36	18,9737	19,0000	19,0263	19,0526	19,0788	19,1050	19,1311	19,1572	19,1833	19,2094
37	19,2354	19,2614	19,2873	19,3132	19,3391	19,3649	19,3907	19,4165	19,4422	19,4679
38	19,4936	19,5192	19,5448	19,5704	19,5959	19,6214	19,6469	19,6723	19,6977	19,7231
39	19,7484	19,7737	19,7990	19,8242	19,8494	19,8746	19,8997	19,9249	19,9499	19,9750
40	20,0000	20,0250	20,0499	20,0749	20,0998	20,1246	20,1494	20,1742	20,1990	20,2237
41	20,2485	20,2731	20,2978	20,3224	20,3470	20,3715	20,3961	20,4206	20,4450	20,4695
42	20,4939	20,5183	20,5426	20,5670	20,5913	20,6155	20,6398	20,6640	20,6882	20,7123
43	20,7364	20,7605	20,7846	20,8087	20,8327	20,8567	20,8806	20,9045	20,9284	20,9523
44	20,9762	21,0000	21,0238	21,0476	21,0713	21,0950	21,1187	21,1424	21,1660	21,1896
45	21,2132	21,2368	21,2603	21,2838	21,3073	21,3307	21,3542	21,3776	21,4009	21,4243
46	21,4476	21,4709	21,4942	21,5174	21,5407	21,5639	21,5870	21,6102	21,6333	21,6564
47	21,6795	21,7025	21,7256	21,7486	21,7715	21,7945	21,8174	21,8403	21,8632	21,8861
48	21,9089	21,9317	21,9545	21,9773	22,0000	22,0227	22,0454	22,0681	22,0907	22,1133
49	22,1359	22,1585	22,1811	22,2036	22,2261	22,2486	22,2711	22,2935	22,3159	22,3383

EJEMPLO DE UTILIZACIÓN DE LA TABLA

$$\sqrt{9} = 3 \quad \sqrt{36} = 6 \quad \sqrt{324} = 18$$

A                      B, B<sub>2</sub>                      C, C<sub>2</sub>, C<sub>3</sub>



Extraído de «Statistique et probabNité», colección Aide-Mémoire TECHNOR, doc. 15 y 16, Deiagrove 1985. Con la autorización del editor.

# Tabla de raíces cuadradas de los números 500 a 999

FORMULAS

√N	B <sub>3</sub>									A <sub>1</sub>											
	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	
50	22,3607	22,3830	22,4054	22,4277	22,4499	22,4722	22,4944	22,5167	22,5389	22,5610											
51	22,5832	22,6053	22,6274	22,6495	22,6716	22,6936	22,7156	22,7376	22,7596	22,7816											
52	22,8035	22,8254	22,8473	22,8692	22,8910	22,9129	22,9347	22,9565	22,9783	23,0000											
53	23,0217	23,0434	23,0651	23,0868	23,1084	23,1301	23,1517	23,1733	23,1948	23,2164											
54	23,2379	23,2594	23,2809	23,3024	23,3238	23,3452	23,3666	23,3880	23,4094	23,4307											
55	23,4521	23,4734	23,4947	23,5160	23,5372	23,5584	23,5797	23,6008	23,6220	23,6432											
56	23,6643	23,6854	23,7065	23,7276	23,7487	23,7697	23,7908	23,8118	23,8328	23,8537											
57	23,8747	23,8956	23,9165	23,9374	23,9583	23,9792	24,0000	24,0208	24,0416	24,0624											
58	24,0832	24,1039	24,1247	24,1454	24,1661	24,1868	24,2074	24,2281	24,2487	24,2693											
59	24,2899	24,3105	24,3311	24,3516	24,3721	24,3926	24,4131	24,4336	24,4540	24,4745											
60	24,4949	24,5153	24,5357	24,5561	24,5764	24,5967	24,6171	24,6374	24,6577	24,6779											
61	24,6982	24,7184	24,7386	24,7588	24,7790	24,7992	24,8193	24,8395	24,8596	24,8797											
62	24,8998	24,9199	24,9399	24,9600	24,9800	25,0000	25,0200	25,0400	25,0599	25,0799											
63	25,0998	25,1197	25,1396	25,1595	25,1794	25,1992	25,2190	25,2389	25,2587	25,2784											
64	25,2982	25,3180	25,3377	25,3574	25,3772	25,3969	25,4165	25,4362	25,4558	25,4755											
65	25,4951	25,5147	25,5343	25,5539	25,5734	25,5930	25,6125	25,6320	25,6515	25,6710											
66	25,6905	25,7099	25,7294	25,7488	25,7682	25,7876	25,8070	25,8263	25,8457	25,8650											
67	25,8844	25,9037	25,9230	25,9422	25,9615	25,9808	26,0000	26,0192	26,0384	26,0576											
68	26,0768	26,0960	26,1151	26,1343	26,1534	26,1725	26,1916	26,2107	26,2298	26,2488											
69	26,2679	26,2869	26,3059	26,3249	26,3439	26,3629	26,3818	26,4008	26,4197	26,4386											
70	26,4575	26,4764	26,4953	26,5141	26,5330	26,5518	26,5707	26,5895	26,6083	26,6271											
71	26,6458	26,6646	26,6833	26,7021	26,7208	26,7395	26,7582	26,7769	26,7955	26,8142											
72	26,8328	26,8514	26,8701	26,8887	26,9072	26,9258	26,9444	26,9629	26,9815	27,0000											
73	27,0185	27,0370	27,0555	27,0740	27,0924	27,1109	27,1293	27,1477	27,1662	27,1846											
74	27,2029	27,2213	27,2397	27,2580	27,2764	27,2947	27,3130	27,3313	27,3496	27,3679											
75	27,3861	27,4044	27,4228	27,4408	27,4591	27,4773	27,4955	27,5136	27,5318	27,5500											
76	27,5681	27,5863	27,6043	27,6222	27,6402	27,6580	27,6767	27,6948	27,7128	27,7308											
77	27,7489	27,7669	27,7849	27,8029	27,8209	27,8388	27,8568	27,8747	27,8927	27,9106											
78	27,9285	27,9464	27,9643	27,9821	28,0000	28,0179	28,0357	28,0535	28,0713	28,0891											
79	28,1069	28,1247	28,1425	28,1603	28,1780	28,1957	28,2135	28,2312	28,2489	28,2666											
80	28,2843	28,3019	28,3196	28,3373	28,3549	28,3725	28,3901	28,4077	28,4253	28,4429											
81	28,4605	28,4781	28,4956	28,5132	28,5307	28,5482	28,5657	28,5832	28,6007	28,6182											
82	28,6356	28,6531	28,6705	28,6880	28,7054	28,7228	28,7402	28,7576	28,7750	28,7924											
83	28,8097	28,8271	28,8444	28,8617	28,8791	28,8964	28,9137	28,9310	28,9482	28,9655											
84	28,9828	29,0000	29,0172	29,0345	29,0517	29,0689	29,0861	29,1033	29,1204	29,1376											
85	29,1548	29,1719	29,1890	29,2062	29,2233	29,2404	29,2575	29,2746	29,2916	29,3087											
86	29,3258	29,3428	29,3598	29,3769	29,3939	29,4109	29,4279	29,4449	29,4618	29,4788											
87	29,4958	29,5127	29,5296	29,5466	29,5635	29,5804	29,5973	29,6142	29,6311	29,6479											
88	29,6648	29,6816	29,6985	29,7153	29,7321	29,7489	29,7658	29,7825	29,7993	29,8161											
89	29,8329	29,8496	29,8664	29,8831	29,8998	29,9166	29,9333	29,9500	29,9666	29,9833											
90	30,0000	30,0167	30,0333	30,0500	30,0666	30,0832	30,0998	30,1164	30,1330	30,1496											
91	30,1662	30,1828	30,1993	30,2159	30,2324	30,2490	30,2655	30,2820	30,2985	30,3150											
92	30,3315	30,3480	30,3645	30,3809	30,3974	30,4138	30,4302	30,4467	30,4631	30,4795											
93	30,4959	30,5123	30,5287	30,5450	30,5614	30,5778	30,5941	30,6105	30,6268	30,6431											
94	30,6594	30,6757	30,6920	30,7083	30,7246	30,7409	30,7571	30,7734	30,7896	30,8058											
95	30,8221	30,8383	30,8545	30,8707	30,8869	30,9031	30,9192	30,9354	30,9516	30,9677											
96	30,9839	31,0000	31,0161	31,0322	31,0483	31,0644	31,0805	31,0966	31,1127	31,1288											
97	31,1448	31,1609	31,1769	31,1929	31,2090	31,2250	31,2410	31,2570	31,2730	31,2890											
98	31,3050	31,3209	31,3369	31,3528	31,3688	31,3847	31,4006	31,4166	31,4325	31,4484											
99	31,4643	31,4802	31,4960	31,5119	31,5278	31,5436	31,5595	31,5753	31,5911	31,6070											

$$\sqrt{576} = 24$$

A A A<sub>3</sub>

$$\sqrt{900} = 30$$

B B B<sub>3</sub>





