Table of Symbols

Symbol		Page
$\cdot$	multiplication, times ($\times$)	3
a^n	nth power of a	9
$\ldots$	and so on	9
( )	parentheses	10
[ ]	brackets	10
$=$	equal sign, is equal to	24
$\stackrel{?}{=}$	is this statement true?	24
$\neq$	is not equal to	24
$<$	is less than	26
$\leq$	is less than or equal to	26
$>$	is greater than	26
$\geq$	is greater than or equal to	26
$\circ$	degree(s)	64
$-a$	the opposite of a	65
$\lvert a \rvert$	absolute value of a	65
$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$	matrix	86
$\dfrac{1}{a}$	reciprocal of a, $a \neq 0$	108
P	probability of an event	114
$\dfrac{a}{b}$	ratio of a to b	140

Symbol		Page
$\overline{AB}$	segment AB	140
AB	the length of $\overline{AB}$	140
$\approx$	is approximately equal to	166
$\dfrac{a}{b}$	rate of a per b	180
(x, y)	ordered pair	203
m	slope	226
k	constant of variation	234
b	y-intercept	241
π	pi, an irrational number approximately equal to 3.14	452
a^{-n}	$\dfrac{1}{a^n}$, $a \neq 0$	456
$c \times 10^n$	scientific notation, where $1 \leq c < 10$ and n is an integer	470
$\sqrt{a}$	the nonnegative square root of a	503
$\pm$	plus or minus	503
$\triangle ABC$	triangle ABC	745
$\angle A$	angle A	752
$\sin A$	sine of $\angle A$	752
$\cos A$	cosine of $\angle A$	752
$\tan A$	tangent of $\angle A$	752

Table of Measures

Time

60 seconds (sec) = 1 minute (min)	$\left.\begin{array}{l}365 \text{ days} \\ 52 \text{ weeks (approx.)} \\ 12 \text{ months}\end{array}\right\} = 1 \text{ year}$
60 minutes = 1 hour (h)	
24 hours = 1 day	10 years = 1 decade
7 days = 1 week	100 years = 1 century
4 weeks (approx.) = 1 month	

Metric

Length

10 millimeters (mm) = 1 centimeter (cm)

$\left.\begin{array}{l}100 \text{ cm} \\ 1000 \text{ mm}\end{array}\right\} = 1 \text{ meter (m)}$

1000 m = 1 kilometer (km)

Area

$\begin{array}{l}100 \text{ square millimeters} = 1 \text{ square centimeter} \\ \left(mm^2\right) \hspace{3cm} \left(cm^2\right)\end{array}$

$10{,}000 \text{ cm}^2 = 1 \text{ square meter } \left(m^2\right)$

$10{,}000 \text{ m}^2 = 1 \text{ hectare (ha)}$

Volume

$\begin{array}{l}1000 \text{ cubic millimeters} = 1 \text{ cubic centimeter} \\ \left(mm^3\right) \hspace{3cm} \left(cm^3\right)\end{array}$

$1{,}000{,}000 \text{ cm}^3 = 1 \text{ cubic meter } \left(m^3\right)$

Liquid Capacity

1000 milliliters (mL) = 1 liter (L)

1000 L = 1 kiloliter (kL)

Mass

1000 milligrams (mg) = 1 gram (g)

1000 g = 1 kilogram (kg)

1000 kg = 1 metric ton (t)

Temperature   Degrees Celsius (°C)

0°C = freezing point of water

37°C = normal body temperature

100°C = boiling point of water

United States Customary

Length

12 inches (in.) = 1 foot (ft)

$\left.\begin{array}{l}36 \text{ in.} \\ 3 \text{ ft}\end{array}\right\} = 1 \text{ yard (yd)}$

$\left.\begin{array}{l}5280 \text{ ft} \\ 1760 \text{ yd}\end{array}\right\} = 1 \text{ mile (mi)}$

Area

$144 \text{ square inches } \left(in.^2\right) = 1 \text{ square foot } \left(ft^2\right)$

$9 \text{ ft}^2 = 1 \text{ square yard } \left(yd^2\right)$

$\left.\begin{array}{l}43{,}560 \text{ ft}^2 \\ 4840 \text{ yd}^2\end{array}\right\} = 1 \text{ acre (A)}$

Volume

$1728 \text{ cubic inches } \left(in.^3\right) = 1 \text{ cubic foot } \left(ft^3\right)$

$27 \text{ ft}^3 = 1 \text{ cubic yard } \left(yd^3\right)$

Liquid Capacity

8 fluid ounces (fl oz) = 1 cup (c)

2 c = 1 pint (pt)

2 pt = 1 quart (qt)

4 qt = 1 gallon (gal)

Weight

16 ounces (oz) = 1 pound (lb)

2000 lb = 1 ton (t)

Temperature   Degrees Fahrenheit (°F)

32°F = freezing point of water

98.6°F = normal body temperature

212°F = boiling point of water

Table of Squares and Square Roots

No.	Square	Sq. Root	No.	Square	Sq. Root	No.	Square	Sq. Root
1	1	1.000	51	2,601	7.141	101	10,201	10.050
2	4	1.414	52	2,704	7.211	102	10,404	10.100
3	9	1.732	53	2,809	7.280	103	10,609	10.149
4	16	2.000	54	2,916	7.348	104	10,816	10.198
5	25	2.236	55	3,025	7.416	105	11,025	10.247
6	36	2.449	56	3,136	7.483	106	11,236	10.296
7	49	2.646	57	3,249	7.550	107	11,449	10.344
8	64	2.828	58	3,364	7.616	108	11,664	10.392
9	81	3.000	59	3,481	7.681	109	11,881	10.440
10	100	3.162	60	3,600	7.746	110	12,100	10.488
11	121	3.317	61	3,721	7.810	111	12,321	10.536
12	144	3.464	62	3,844	7.874	112	12,544	10.583
13	169	3.606	63	3,969	7.937	113	12,769	10.630
14	196	3.742	64	4,096	8.000	114	12,996	10.677
15	225	3.873	65	4,225	8.062	115	13,225	10.724
16	256	4.000	66	4,356	8.124	116	13,456	10.770
17	289	4.123	67	4,489	8.185	117	13,689	10.817
18	324	4.243	68	4,624	8.246	118	13,924	10.863
19	361	4.359	69	4,761	8.307	119	14,161	10.909
20	400	4.472	70	4,900	8.367	120	14,400	10.954
21	441	4.583	71	5,041	8.426	121	14,641	11.000
22	484	4.690	72	5,184	8.485	122	14,884	11.045
23	529	4.796	73	5,329	8.544	123	15,129	11.091
24	576	4.899	74	5,476	8.602	124	15,376	11.136
25	625	5.000	75	5,625	8.660	125	15,625	11.180
26	676	5.099	76	5,776	8.718	126	15,876	11.225
27	729	5.196	77	5,929	8.775	127	16,129	11.269
28	784	5.292	78	6,084	8.832	128	16,384	11.314
29	841	5.385	79	6,241	8.888	129	16,641	11.358
30	900	5.477	80	6,400	8.944	130	16,900	11.402
31	961	5.568	81	6,561	9.000	131	17,161	11.446
32	1,024	5.657	82	6,724	9.055	132	17,424	11.489
33	1,089	5.745	83	6,889	9.110	133	17,689	11.533
34	1,156	5.831	84	7,056	9.165	134	17,956	11.576
35	1,225	5.916	85	7,225	9.220	135	18,225	11.619
36	1,296	6.000	86	7,396	9.274	136	18,496	11.662
37	1,369	6.083	87	7,569	9.327	137	18,769	11.705
38	1,444	6.164	88	7,744	9.381	138	19,044	11.747
39	1,521	6.245	89	7,921	9.434	139	19,321	11.790
40	1,600	6.325	90	8,100	9.487	140	19,600	11.832
41	1,681	6.403	91	8,281	9.539	141	19,881	11.874
42	1,764	6.481	92	8,464	9.592	142	20,164	11.916
43	1,849	6.557	93	8,649	9.644	143	20,449	11.958
44	1,936	6.633	94	8,836	9.695	144	20,736	12.000
45	2,025	6.708	95	9,025	9.747	145	21,025	12.042
46	2,116	6.782	96	9,216	9.798	146	21,316	12.083
47	2,209	6.856	97	9,409	9.849	147	21,609	12.124
48	2,304	6.928	98	9,604	9.899	148	21,904	12.166
49	2,401	7.000	99	9,801	9.950	149	22,201	12.207
50	2,500	7.071	100	10,000	10.000	150	22,500	12.247

Table of Trigonometric Ratios

Angle	Sine	Cosine	Tangent
1°	.0175	.9998	.0175
2°	.0349	.9994	.0349
3°	.0523	.9986	.0524
4°	.0698	.9976	.0699
5°	.0872	.9962	.0875
6°	.1045	.9945	.1051
7°	.1219	.9925	.1228
8°	.1392	.9903	.1405
9°	.1564	.9877	.1584
10°	.1736	.9848	.1763
11°	.1908	.9816	.1944
12°	.2079	.9781	.2126
13°	.2250	.9744	.2309
14°	.2419	.9703	.2493
15°	.2588	.9659	.2679
16°	.2756	.9613	.2867
17°	.2924	.9563	.3057
18°	.3090	.9511	.3249
19°	.3256	.9455	.3443
20°	.3420	.9397	.3640
21°	.3584	.9336	.3839
22°	.3746	.9272	.4040
23°	.3907	.9205	.4245
24°	.4067	.9135	.4452
25°	.4226	.9063	.4663
26°	.4384	.8988	.4877
27°	.4540	.8910	.5095
28°	.4695	.8829	.5317
29°	.4848	.8746	.5543
30°	.5000	.8660	.5774
31°	.5150	.8572	.6009
32°	.5299	.8480	.6249
33°	.5446	.8387	.6494
34°	.5592	.8290	.6745
35°	.5736	.8192	.7002
36°	.5878	.8090	.7265
37°	.6018	.7986	.7536
38°	.6157	.7880	.7813
39°	.6293	.7771	.8098
40°	.6428	.7660	.8391
41°	.6561	.7547	.8693
42°	.6691	.7431	.9004
43°	.6820	.7314	.9325
44°	.6947	.7193	.9657
45°	.7071	.7071	1.0000

Angle	Sine	Cosine	Tangent
46°	.7193	.6947	1.0355
47°	.7314	.6820	1.0724
48°	.7431	.6691	1.1106
49°	.7547	.6561	1.1504
50°	.7660	.6428	1.1918
51°	.7771	.6293	1.2349
52°	.7880	.6157	1.2799
53°	.7986	.6018	1.3270
54°	.8090	.5878	1.3764
55°	.8192	.5736	1.4281
56°	.8290	.5592	1.4826
57°	.8387	.5446	1.5399
58°	.8480	.5299	1.6003
59°	.8572	.5150	1.6643
60°	.8660	.5000	1.7321
61°	.8746	.4848	1.8040
62°	.8829	.4695	1.8807
63°	.8910	.4540	1.9626
64°	.8988	.4384	2.0503
65°	.9063	.4226	2.1445
66°	.9135	.4067	2.2460
67°	.9205	.3907	2.3559
68°	.9272	.3746	2.4751
69°	.9336	.3584	2.6051
70°	.9397	.3420	2.7475
71°	.9455	.3256	2.9042
72°	.9511	.3090	3.0777
73°	.9563	.2924	3.2709
74°	.9613	.2756	3.4874
75°	.9659	.2588	3.7321
76°	.9703	.2419	4.0108
77°	.9744	.2250	4.3315
78°	.9781	.2079	4.7046
79°	.9816	.1908	5.1446
80°	.9848	.1736	5.6713
81°	.9877	.1564	6.3138
82°	.9903	.1392	7.1154
83°	.9925	.1219	8.1443
84°	.9945	.1045	9.5144
85°	.9962	.0872	11.4301
86°	.9976	.0698	14.3007
87°	.9986	.0523	19.0811
88°	.9994	.0349	28.6363
89°	.9998	.0175	57.2900

Table of Formulas

Geometric Formulas

Perimeter of a polygon	$P = a + b + \ldots + z$ where $a, b, \ldots, z =$ side lengths
Area of a triangle	$A = \frac{1}{2}bh$ where $b =$ base and $h =$ height
Area of a square	$A = s^2$ where $s =$ side length
Area of a rectangle	$A = lw$ where $l =$ length and $w =$ width
Area of a trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$ where $h =$ height and $b_1, b_2 =$ bases
Volume of a cube	$V = s^3$ where $s =$ edge length
Volume of a rectangular prism	$V = lwh$ where $l =$ length, $w =$ width, and $h =$ height
Circumference of a circle	$C = \pi d$ where $\pi \approx 3.14$ and $d =$ diameter $C = 2\pi r$ where $\pi \approx 3.14$ and $r =$ radius
Area of a circle	$A = \pi r^2$ where $\pi \approx 3.14$ and $r =$ radius
Surface area of a sphere	$S = 4\pi r^2$ where $\pi \approx 3.14$ and $r =$ radius
Volume of a sphere	$V = \frac{4}{3}\pi r^3$ where $\pi \approx 3.14$ and $r =$ radius

Other Formulas

Average speed	$r = \dfrac{d}{t}$ or $d = rt$ where $r =$ average rate or speed, $d =$ distance, and $t =$ time
Probability of an event	$P = \dfrac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$ where $0 \leq P \leq 1$

Algebraic Formulas

Slope formula	$m = \dfrac{y_2 - y_1}{x_2 - x_1}$ where $m =$ slope and (x_1, y_1) and (x_2, y_2) are two points
Quadratic formula	The solutions of $ax^2 + bx + c = 0$ are $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ when $a \neq 0$ and $b^2 - 4ac \geq 0$.
Pythagorean theorem	$a^2 + b^2 = c^2$ where $a, b =$ length of the legs and $c =$ length of the hypotenuse of a right triangle
Distance formula	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ where $d =$ distance and (x_1, y_1) and (x_2, y_2) are coordinates of two points
Midpoint formula	The midpoint between (x_1, y_1) and (x_2, y_2) is $\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2} \right)$.

Table of Properties

Basic Properties

	Addition	**Multiplication**
Closure	$a + b$ is a real number.	ab is a real number.
Commutative	$a + b = b + a$	$ab = ba$
Associative	$(a + b) + c = a + (b + c)$	$(ab)c = a(bc)$
Identity	$a + 0 = a, 0 + a = a$	$a(1) = a, 1(a) = a$
Inverse Property	$a + (-a) = 0$	$a \cdot \dfrac{1}{a} = 1, a \neq 0$
Prop. of zero in mult.		$a(0) = 0$
Property of opposites		$(-1)a = -a$ or $a(-1) = -a$
Distributive	$a(b + c) = ab + ac$ or $(b + c)a = ba + ca$	

Properties of Equality

Addition	If $a = b$, then $a + c = b + c$.
Subtraction	If $a = b$, then $a - c = b - c$.
Multiplication	If $a = b$, then $ca = cb$.
Division	If $a = b$, and $c \neq 0$, then $\dfrac{a}{c} = \dfrac{b}{c}$.

Properties of Exponents

Product of Powers	$a^m \cdot a^n = a^{m+n}$
Power of a Power	$(a^m)^n = a^{m \cdot n}$
Power of a Product	$(a \cdot b)^m = a^m \cdot b^m$
Quotient of Powers	$\dfrac{a^m}{a^n} = a^{m-n}, a \neq 0$
Power of a Quotient	$\left(\dfrac{a}{b}\right)^m = \dfrac{a^m}{b^m}, b \neq 0$
Negative Exponent	$a^{-n} = \dfrac{1}{a^n}, a \neq 0$
Zero Exponent	$a^0 = 1, a \neq 0$

Properties of Radicals

Product Property	$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$
Quotient Property	$\sqrt{\dfrac{a}{b}} = \dfrac{\sqrt{a}}{\sqrt{b}}$

Properties of Proportions

Reciprocal	If $\dfrac{a}{b} = \dfrac{c}{d}$, then $\dfrac{b}{a} = \dfrac{d}{c}$.
Cross-multiplying	If $\dfrac{a}{b} = \dfrac{c}{d}$, then $ad = bc$.

Special Products and Their Factors

Sum and Difference Pattern	$(a + b)(a - b) = a^2 - b^2$
Square of a Binomial Pattern	$(a + b)^2 = a^2 + 2ab + b^2$
	$(a - b)^2 = a^2 - 2ab + b^2$
FOIL	$(a + b)(c + d) = a \cdot c + a \cdot d + b \cdot c + b \cdot d$
	First Outer Inner Last

Properties of Rational Expressions

Multiplication	$\dfrac{a}{b} \cdot \dfrac{c}{d} = \dfrac{ac}{bd}$
Division	$\dfrac{a}{b} \div \dfrac{c}{d} = \dfrac{a}{b} \cdot \dfrac{d}{c}$
Addition	$\dfrac{a}{c} + \dfrac{b}{c} = \dfrac{a + b}{c}$
Subtraction	$\dfrac{a}{c} - \dfrac{b}{c} = \dfrac{a - b}{c}$