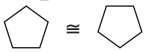
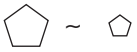
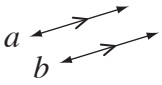
SYMBOLS

Number

+	plus or add
–	minus or subtract
×	multiplied by, times, lots of
÷	divided by, into groups of
=	equals, is equal to
≠	is not equal to
≈	is approximately equal to
<	is less than, $4 < 6$
>	is greater than, $8 > 5$
≤	is less than or equal to
≥	is greater than or equal to
≅	is congruent to, 
~	is similar to, 
∩	intersects
∥	is parallel to
⊥	is perpendicular to
%	percent, $12\% = \frac{12}{100}$
.	decimal point as in 7.9
6^3	6 raised to the 3rd power, $6 \times 6 \times 6$
$\sqrt{9}$	square root of 9
( )	parentheses, or brackets - a grouping symbol
$\frac{4}{7}$	fraction, $4 \div 7$, four sevenths
$3x$	3 times x, 3 lots of x, $3 \cdot x$
$a : b$	ratio of a to b
–3	negative 3

Geometry

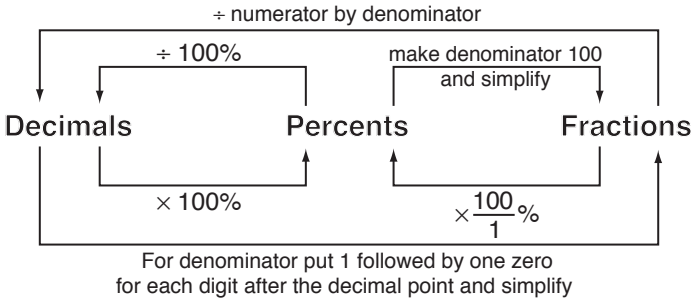
°	degree, a right angle measures 90°
π	pi, ≈ 3.14 or $\frac{22}{7}$ ratio of the circumference to the diameter of a circle
ΔABC	triangle with vertices A, B and C
	right angle
$\overleftrightarrow{AD}$	line
$\overline{BC}$	segment
(a,b)	ordered pair with x-coordinate a and y-coordinate b
	line a is parallel to line b
	equal angles
	equal side lengths

NUMBER FACTS (1)

Place Value

millions	*hundreds of thousands*	*tens of thousands*	*thousands*	*hundreds*	*tens*	*units*	*decimal point*	*tenths*	*hundredths*	*thousandths*
1,000,000	*100,000*	*10,000*	*1000*	*100*	*10*	*1*	•	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$

Decimals / Fractions / Percents



Fraction	Decimal	Percent
$\frac{1}{1}$	1	100%
$\frac{1}{2}$	0.5	50%
$\frac{1}{3}$	$0.\overline{3}$	33.33%
$\frac{2}{3}$	$0.\overline{6}$	66.66%
$\frac{1}{4}$	0.25	25%
$\frac{3}{4}$	0.75	75%
$\frac{1}{5}$	0.2	20%
$\frac{2}{5}$	0.4	40%
$\frac{3}{5}$	0.6	60%
$\frac{4}{5}$	0.8	80%
$\frac{1}{8}$	0.125	12.5%
$\frac{1}{9}$	$0.\overline{1}$	11.11%

Prime numbers < 100

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89 and 97

Perfect squares of numbers 0 to 30

0, 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225, 256, 289, 324, 361, 400, 441, 484, 529, 576, 625, 676, 729, 784, 841 and 900

NUMBER FACTS (2)

Real Numbers $\mathbb{R}$

IRRATIONAL
π, φ, e, $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$,
2.6293045632....
cos 30°

$\mathbb{Q}$
RATIONAL
$-2\frac{3}{7}$, 3.010101..., $\frac{4}{10}$, 0.56, $\sqrt{\frac{4}{9}}$

$\mathbb{Z}$
Integers
..., –3, –2, –1, 0, 1, 2, 3, ...

$\mathbb{N}$
Natural (Whole Numbers)
0, 1, 2, 3, 4, 5, 6, ...

Operation terminology

Addition: sum, all together, in total, more than
Subtraction: difference, less than, change
Multiplication: product, times, lots of
Division: a fraction (half, third, quarter) of, quotient

Order of operations

1) Simplify inside all brackets first.
2) Evaluate powers and square roots.
3) Do all multiplications or divisions in order from left to right.
4) Do all additions or subtractions in order from left to right.

Ratios and Proportions

$$a : b = \frac{a}{b}$$

$$a : b = c : d$$

$$\frac{a}{b} \times \frac{c}{d}$$

$$a \times d = b \times c$$

$$ad = bc$$

ZERO

Adding and subtracting 0

Adding and subtracting 0 to any number leaves the number unchanged.

$$3+0=3 \qquad 3-0=3$$
$$2.5+0=2.5 \qquad 2.5-0=2.5$$
$$\frac{4}{9}+0=\frac{4}{9} \qquad \frac{4}{9}-0=\frac{4}{9}$$

0 used in decimals

0's can be added when needed after the last digit and the decimal point.

$$4=4.000$$

0's can be added when needed before the first digit of the decimal number.

$$4=4.0=0004.0$$

By convention, decimal numbers less than 1 are written with a 0 before the decimal point.

$$.4=0.4$$

0 as a probability

When the probability of an event is 0, the event is 'impossible'.

0 in words

Some of the words used to represent 0 are: nought, nil, none, nothing, zilch, zip.

Multiplying by 0

The product of any number and 0 is 0

$$7\times 0=0$$
$$81.6\times 0=0$$
$$\frac{3}{5}\times 0=0$$

Dividing by 0

Dividing by 0 is meaningless.

$4\div 0$ and $\frac{3}{0}$ are meaningless operations.

Power of 0

Any number raised to the power of 0 is 1

$$1^0=1$$
$$(0.5)^0=1$$
$$(-24)^0=1$$

0 as the result of a sum

The sum of any number, except zero, and its opposite is 0

$$4+(-4)=0$$
$$2.6+(-2.6)=0$$
$$\frac{5}{8}+(-\frac{5}{8})=0$$

0 facts

0 is a whole number and a digit but is neither a positive nor a negative number.

ONE

Multiplying by 1

Any number multiplyed by 1 remains unchanged.

$$3 \times 1 = 3$$
$$2.5 \times 1 = 2.5$$
$$\frac{4}{9} \times 1 = \frac{4}{9}$$

Dividing by 1

Any number divided by 1 remains unchanged.

$$7 \div 1 = 7$$
$$81.6 \div 1 = 81.6$$
$$\frac{3}{5} \div 1 = \frac{3}{5}$$

1 as a fraction

1 can be renamed as a fraction whenever the numerator is the same as the denominator.

$1 = \frac{2}{2}$ $1 = \frac{3}{3}$ $1 = \frac{4}{4}$ $1 = \frac{5}{5}$

Power of 1

Any number raised to the power of 1 remains unchanged

$$7^1 = 7$$
$$(6.8)^1 = 6.8$$
$$(-4)^1 = -4$$

1 as a probability

When the probability of an event is 1, the event is 'certain' to happen.

1 as a percent

1 is the same as 100%.

$$1 = \frac{100}{100} = 100\%$$

1 as a denominator

Any whole number can be written as a fraction with denominator 1

$$20 = \frac{20}{1}$$

1 as the result of a product

The product of any number, except zero, and its reciprocal is 1

$$4 \times \frac{1}{4} = 1$$

1 in words

Some of the words used to represent 1 are: one, a, an, each, single, unit.

1 facts

1 is a whole number and a digit but not a prime number.

1 is a factor of any whole number.

MEASUREMENT FACTS (1)

CONVERSIONS - Customary

Length

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

3 ft = 36 in. = 1 yard (yd)

5280 ft = 1760 yd = 1 mile (mi)

Mass

16 ounces (oz) = 1 pound (lb)

2000 lb = 1 ton

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)

Temperature - degrees Fahrenheit (°F)

32°F = freezing point of water

98.6°F = human body temperature

212°F = boiling point of water

Area

144 square inch ($in.^2$) = 1 square feet (ft^2)

9 ft^2 = 1square yard (yd^2)

CONVERSIONS - Metric

Length

10 millimeters (mm) = 1 centimeter (cm)

100 cm = 1000 mm = 1 meter (m)

1000 m = 1 kilometer (km)

Mass

1000 milligrams (mg) = 1 gram (g)

1000 g = 1 kilogram (kg)

1000 kg = 1 tonne (t)

Liquid Capacity

1000 milliliters (mL) = 1000 cm^3 = 1 liter (L)

1000 L = 1 kiloliter (kL)

Temperature - degrees Celsius (°C)

0°C = freezing point of water

37°C = human body temperature

100°C = boiling point of water

Area

100 square mm (mm^2) = 1 square cm (cm^2)

10,000 cm^2 = 1 square meter (m^2)

1,000,000 m^2 = 1 square km (km^2)

Volume

1000 cubic mm (mm^3) = 1 cubic cm (cm^3)

1,000,000 cm^3 = 1 cubic meter (m^3)

MEASUREMENT FACTS (2)

Time

60 seconds (s) = 1 minute (min)

60 minutes (min) = 1 hour (h)

24 hours = 1 day

7 days = 1 week

4 weeks (approx.) = 1 month

365 or 366 days =
52 weeks (approx.) = } 1 year
12 months =

10 years = 1 decade

100 years = 1 century

Conversion factors: metric ⇔ customary

Length

1 inch ≈ 2.54 centimeters

1 kilometer ≈ 0.62 miles

Mass

1 ounce ≈ 28 grams

1 kilogram ≈ 2.2 pounds

Liquid Capacity

1 liter ≈ 1.06 quarts

Capacity

1 milliliter (mL) = 1 cubic centimeter (cm^3)

1000 liter (L) = 1 cubic meter (m^3)

PREFIXES

Metric Prefixes

giga (G) = 1 billion = 1,000,000,000

mega (M) = 1 million = 1,000,000

kilo (k) = 1 thousand = 1000

hecto (h) = 1 hundred = 100

deca (da) = 1 ten = 10

deci (d) = 1 tenth = $\frac{1}{10}$

centi (c) = 1 hundredth = $\frac{1}{100}$

milli (m) = 1 thousandth = $\frac{1}{1000}$

micro (μ) = 1 millionth = $\frac{1}{1,000,000}$

Geometric Prefixes

poly - many
equi - equal
hedra - face
gon - angle
lateral - side

Number Prefixes

mono - one
bi or **di** - two
tri - three
quad or **tetra** - four
penta - five
hexa - six
hepta - seven
octa - eight
nona - nine
deca - ten