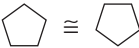
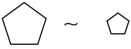



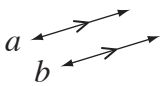


MATH FACTS

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
°	degree, a right angle measures 90°
<i>l</i>	length
<i>w</i>	width
<i>h</i>	height
<i>b</i>	base length
<i>P</i>	perimeter
<i>r</i>	radius
<i>C</i>	circumference
<i>A</i>	area
<i>V</i>	volume

Geometry

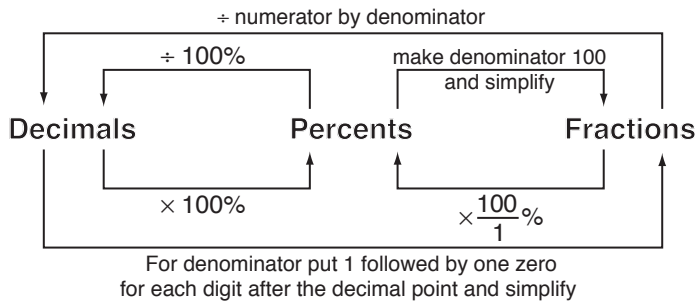
6^3	6 raised to the 3 rd power, $6 \times 6 \times 6$
$\sqrt{9}$	square root of 9
()	parentheses, or brackets - a grouping symbol
$\frac{4}{7}$	fraction, $4 \div 7$, four sevenths
$3x$	3 times x , 3 lots of x , $3 \cdot x$
$a : b$	ratio of a to b
-3	negative 3
π	pi, ≈ 3.14 or $\frac{22}{7}$ ratio of the circumference to the diameter of a circle
$\triangle ABC$	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%
$\frac{1}{3}$	$0.\bar{3}$	33.33%
$\frac{2}{3}$	$0.\bar{6}$	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%
$\frac{1}{9}$	$0.\bar{1}$	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

$\pi, \phi, e, \sqrt{2}, \sqrt{3}, \sqrt{5},$
 $2.6293045632\dots$
 $\cos 30^\circ$

 \mathbb{Q}

RATIONAL

$-2\frac{3}{7}, 3.010101\dots,$
 $\frac{4}{10}, 0.56, \sqrt{\frac{4}{9}}$

 \mathbb{Z}

Integers

$\dots, -3, -2, -1, 0, 1, 2, 3, \dots$

 \mathbb{N}

Natural (Whole Numbers)
 $0, 1, 2, 3, 4, 5, 6, \dots$

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.

$$3 + 0 = 3$$

$$3 - 0 = 3$$

$$2.5 + 0 = 2.5$$

$$2.5 - 0 = 2.5$$

$$\frac{4}{9} + 0 = \frac{4}{9}$$

$$\frac{4}{9} - 0 = \frac{4}{9}$$

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

$$4 + (-4) = 0$$

$$2.6 + (-2.6) = 0$$

$$\frac{5}{8} + \left(-\frac{5}{8}\right) = 0$$

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 multiplied by **1** remains unchanged.

$$3 \times 1 = 3$$

$$2.5 \times 1 = 2.5$$

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

1 as a fraction

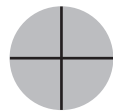
1 can be renamed as a fraction whenever the numerator is the same as the denominator.



$$1 = \frac{2}{2}$$



$$1 = \frac{3}{3}$$



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



$$1 = \frac{5}{5}$$

1 as a probability

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

1 as a denominator

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

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

1 in words

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

Dividing by 1

Any number divided by **1** remains unchanged.

$$7 \div 1 = 7$$

$$81.6 \div 1 = 81.6$$

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

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 percent

1 is the same as 100%.

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

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 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**

$$12 \text{ inches (in.)} = 1 \text{ foot (ft)}$$

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

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

Mass

$$16 \text{ ounces (oz)} = 1 \text{ pound (lb)}$$

$$2000 \text{ lb} = 1 \text{ ton}$$

Liquid Capacity

$$8 \text{ fluid ounces (fl oz)} = 1 \text{ cup (c)}$$

$$2 \text{ c} = 1 \text{ pint (pt)}$$

$$2 \text{ pt} = 1 \text{ quart (qt)}$$

$$4 \text{ qt} = 1 \text{ gallon (gal)}$$

Temperature - degrees Fahrenheit (°F)

$$32^{\circ}\text{F} = \text{freezing point of water}$$

$$98.6^{\circ}\text{F} = \text{human body temperature}$$

$$212^{\circ}\text{F} = \text{boiling point of water}$$

Area

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

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

CONVERSIONS - Metric**Length**

$$10 \text{ millimeters (mm)} = 1 \text{ centimeter (cm)}$$

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

$$1000 \text{ m} = 1 \text{ kilometer (km)}$$

Mass

$$1000 \text{ milligrams (mg)} = 1 \text{ gram (g)}$$

$$1000 \text{ g} = 1 \text{ kilogram (kg)}$$

$$1000 \text{ kg} = 1 \text{ tonne (t)}$$

Liquid Capacity

$$\begin{array}{l} 1000 \text{ milliliters (mL)} = \\ 1000 \text{ cm}^3 = \end{array} \left. \vphantom{\begin{array}{l} 1000 \text{ milliliters (mL)} = \\ 1000 \text{ cm}^3 = \end{array}} \right] 1 \text{ liter (L)}$$

$$1000 \text{ L} = 1 \text{ kiloliter (kL)}$$

Temperature - degrees Celsius (°C)

$$0^{\circ}\text{C} = \text{freezing point of water}$$

$$37^{\circ}\text{C} = \text{human body temperature}$$

$$100^{\circ}\text{C} = \text{boiling point of water}$$

Area

$$100 \text{ square mm (mm}^2\text{)} = 1 \text{ square cm (cm}^2\text{)}$$

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

$$1,000,000 \text{ m}^2 = 1 \text{ square km (km}^2\text{)}$$

Volume

$$1000 \text{ cubic mm (mm}^3\text{)} = 1 \text{ cubic cm (cm}^3\text{)}$$

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

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 = $\left. \begin{array}{l} \\ \\ \\ \end{array} \right\} 1 \text{ year}$
52 weeks (approx.) =
12 months =
10 years = 1 decade
100 years = 1 century

Conversion factors: metric \leftrightarrow customary

Length

1 inch \approx 2.54 centimeters
1 kilometer \approx 0.62 miles

Mass

1 ounce \approx 28 grams
1 kilogram \approx 2.2 pounds

Liquid Capacity

1 liter \approx 1.06 quarts

Capacity

1 milliliter (mL) = 1 cubic centimeter (cm³)
1000 liter (L) = 1 cubic meter (m³)

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