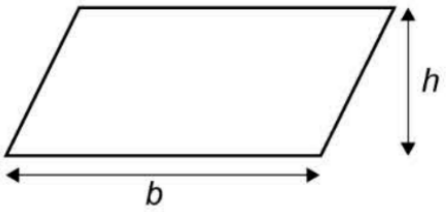
Area

Area of a parallelogram

$A = b \times h$, where b is the base, h is the height

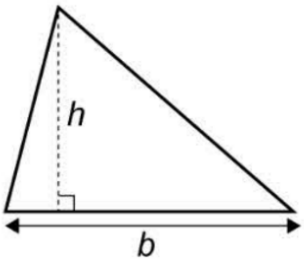
Parallelogram



Area of a triangle

$A = \frac{1}{2}(b \times h)$, where b is the base, h is the height

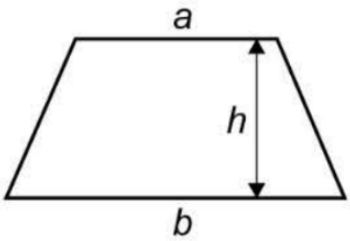
Triangle



Area of a trapezium

$A = \frac{1}{2}(a + b)h$, where a and b are the parallel sides, h is the height

Trapezium



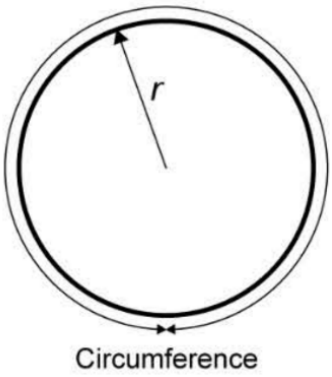
Area of a circle

$A = \pi r^2$, where r is the radius

Circumference of a circle

$C = 2\pi r$, where r is the radius

Circle



Surface area and volume

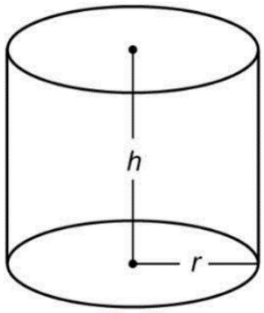
Area of the curved surface of a cylinder

$A = 2\pi rh$, where r is the radius, h is the height

Volume of a cylinder

$V = \pi r^2 h$, where r is the radius, h is the height

Cylinder



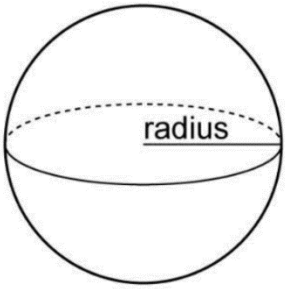
Surface area of a sphere

$A = 4\pi r^2$, where $r$is the radius

Volume of a sphere

$V = \frac{4}{3}\pi r^3$, where $r$is the radius

Sphere



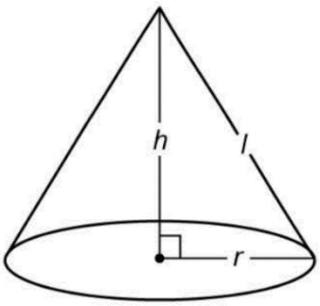
Area of the curved surface of a cone

$A = \pi rl$, where $r$is the radius, l is the slant height

Volume of a cone

$V = \frac{1}{3}\pi r^2 h$, where r is the radius, h is the height

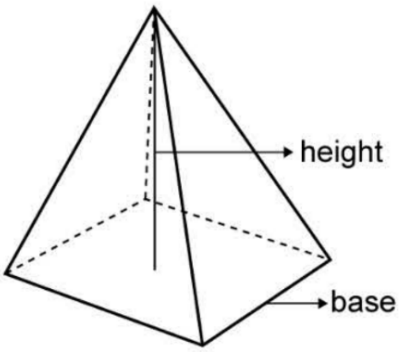
Cone



Volume of a pyramid

$V = \frac{1}{3}Ah$, where A is the area of the base, h is the vertical height

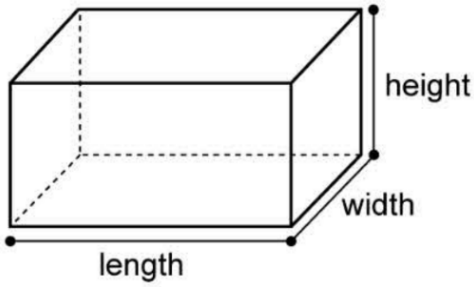
Pyramid



Volume of a cuboid

$V = l \times w \times h$, where l is the length, w is the Width, h is the height

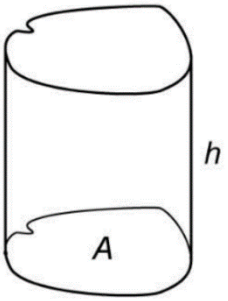
Cuboid



Volume of a prism

$V = Ah$, where A is the area of cross-section, h is the height

Prism



Linear Functions

Coordinates of the midpoint of a line segment with endpoints (x_1, y_1) and (x_2, y_2)

$$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

Distance between two points (x_1, y_1) and (x_2, y_2)

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

Equation of a straight line

$$y = mx + c; \; ax + by + d = 0$$

Gradient formula

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Quadratic Functions

Axis of symmetry of a quadratic function

$$f(x) = ax^2 + bx + c \Rightarrow axis\ of\ symmetry\ x = -\frac{b}{2a}$$

Solutions of a quadratic equation

$$ax^2 + bx + c = 0 \Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}, a \neq 0$$

Discriminant

$$\Delta = b^2 - 4ac$$

Pythagoras' Theorem and trigonometric ratios

Pythagoras' Theorem

$$c^2 = a^2 + b^2$$

Trigonometry identity

$$\tan tan\,\theta = \frac{\sin sin\,\theta}{cos\theta}$$

The basic trigonometric ratios

$$sinB = \frac{opp}{hyp}$$

$$cosB = \frac{adj}{hyp}$$

$$tanB = \frac{opp}{adj} = \frac{sinB}{cosB}$$

opp: opposite, adj: adjacent, hyp: hypotenuse

Trigonometry (Extended only)

Cosine rule

$$c^2 = a^2 + b^2 - 2abcosC; \qquad cosC = \frac{a^2+b^2-c^2}{2ab}$$

Sine rule

$$\frac{a}{sinA} = \frac{b}{sinB} = \frac{c}{sinC}$$

Sequences (Extended only)

Arithmetic sequence

The nth term of an arithmetic sequence

$$U_n = U_1 + (n - 1)d$$

Geometric sequence

The nth term of a geometric sequence

$$U_n = U_1 r^{n-1}$$

Exponents and logarithms (Extended only)

Exponents and logarithms

$$a^x = b \Leftrightarrow x = log_a b$$

Relationships between logarithmic and exponential function

$$a^x = e^{xlna}$$

$$log_a a^x = x = a^{log_a x}$$

Laws of logarithms

$$log_c a + log_c b = log_c ab$$

$$log_c a - log_c b = log_c \frac{a}{b}$$

$$log_c a^r = r log_c a$$

Statistics and probability

Statistics

Arithmetic mean of a set of data

$$Arithmetic\ mean = \frac{sum\ of\ the\ values}{total\ number\ of\ values}$$

$$Interquartile\ range\ IQR = upper\ quartile - lower\ quartile = UQ - LQ = Q_3 - Q_1$$

Probability

Probability of event A

$$P(A) = \frac{number\ of\ outcomes\ in\ A}{total\ number\ of\ outcomes}$$

Mutually exclusive events

$$P(A \cap B) = 0$$

Complementary events

$$P(A') = 1 - P(A)$$

Combined events

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

Independent events (Extended only)

$$P(A \cap B) = P(A) \times P(B)$$

Conditional probability (Extended only)

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$