

Maths Formulas Year 10

Surface Area and Volume

Surface area of a cylinder

$$2\pi r^2 + 2\pi rh$$

Surface area of a cone

$$\pi rl + \pi r^2$$

l = slant height

Surface area of a sphere

$$4\pi r^2$$

Volume of a pyramid

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

Volume of a cone

$$V = \frac{1}{3}\pi r^2 h$$

Volume of a sphere

$$V = \frac{4}{3}\pi r^3$$

Volume and capacity

$$1\text{m}^3 = 1\text{kL}$$

$$1\text{cm}^3 = 1\text{mL}$$

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Saving and Borrowing

Compound Interest

$$A = P(1 + R)^n$$

Depreciation

$$A = P(1 - R)^n$$

Coordinate Geometry

Distance formula

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

Parallel & Perpendicular lines

Parallel if: $m_1 = m_2$

Perpendicular if: $m_1 \times m_2 = -1$

Point-gradient form of a linear equation

$$y - y_1 = m(x - x_1)$$

Tests for quadrilaterals

Parallelogram

- Both opp. angles =
- Both opp. sides =
- Both opp. sides $\parallel$
- One opp. sides = & $\parallel$
- Diagonals bisect

Rectangle

- All angles 90°
- Diagonals = & bisect

Rhombus

- All sides =
- Diagonals bisect @ 90°

Square

- All sides = AND 1 x 90° angle
- Diagonals = & bisect @ 90°

Trigonometry

Trigonometric ratios of complementary angles

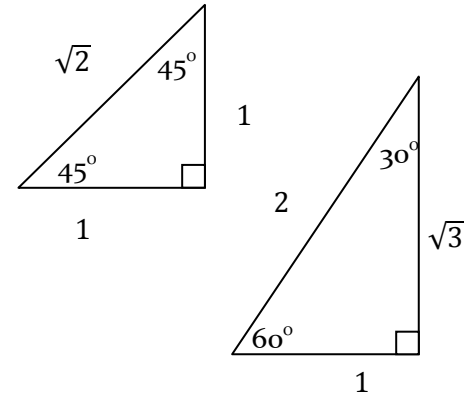
$$\sin A = \cos(90 - A)$$

$$\cos A = \sin(90 - A)$$

Tangent ratio

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

Exact trigonometric ratios



Unit circle

$\sin \theta$ = y-coordinate of P

$\cos \theta$ = x-coordinate of P

$$\tan \theta = \frac{\text{y-coordinate of P}}{\text{x-coordinate of P}}$$

Acute Angles

$$\sin(180 - A) = \sin A$$

$$\cos(180 - A) = -\cos A$$

$$\tan(180 - A) = -\tan A$$

1. The trigonometric ratios of acute angles are *all* positive.
2. Only the sine ratio of obtuse angles is positive.
The cosine and tangent ratios of obtuse angles are negative.

Sine Rule

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Two sides and two angles opposite them.

Cosine Rule

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$\cos A = \frac{(b^2 + c^2 - a^2)}{2bc}$$

Three sides and one angle.

Area of a triangle

$$\text{Area} = \frac{1}{2}ab \sin C$$