

Formulas for national tests in mathematics 1

PREFIXES

Symbol	T	G	M	k	h	d	c	m	μ	n	p
Name	tera	giga	mega	kilo	hecto	deci	centi	milli	micro	nano	pico
Power of ten	10^{12}	10^9	10^6	10^3	10^2	10^{-1}	10^{-2}	10^{-3}	10^{-6}	10^{-9}	10^{-12}

EXPONENTS

For all real numbers x and y and positive numbers a and b

$$a^x a^y = a^{x+y}$$

$$\frac{a^x}{a^y} = a^{x-y}$$

$$\frac{a^x}{b^x} = \left(\frac{a}{b}\right)^x$$

$$a^{-x} = \frac{1}{a^x}$$

$$(a^x)^y = a^{xy}$$

$$a^x b^x = (ab)^x$$

$$a^{\frac{1}{n}} = \sqrt[n]{a}$$

$$a^0 = 1$$

FUNCTIONS

Equation of a line

$y = kx + m$ if $y = kx$ then y is proportional to x

Exponential function

$y = Ca^x$ where C and a are constants $a > 0$ and $a \neq 1$

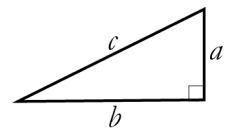
Power function

$y = Cx^a$ where C and a are constants

GEOMETRY

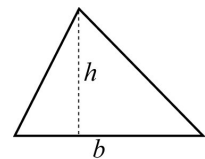
Pythagoras' theorem

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



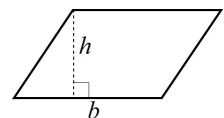
Triangle

$$\text{area} = \frac{bh}{2}$$



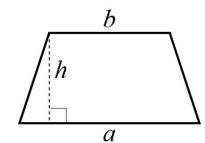
Parallelogram

$$\text{area} = bh$$



Parallel trapezium

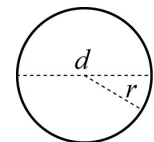
$$\text{area} = \frac{h(a+b)}{2}$$



Circle

$$\text{area} = \pi r^2 = \frac{\pi d^2}{4}$$

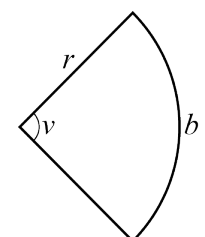
$$\text{circumference} = 2\pi r = \pi d$$



Circle sector

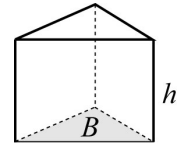
$$\text{arc length } b = \frac{v}{360^\circ} \cdot 2\pi r$$

$$\text{area} = \frac{v}{360^\circ} \cdot \pi r^2 = \frac{br}{2}$$



Prism

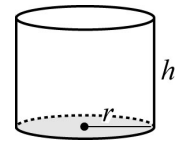
$$\text{volume} = Bh$$

**Cylinder**

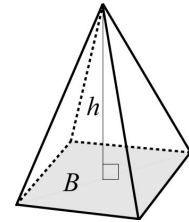
Right circular cylinder

$$\text{volume} = \pi r^2 h$$

$$\text{mantle area} = 2\pi r h$$

**Pyramid**

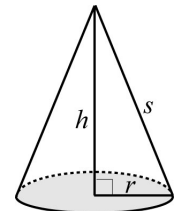
$$\text{volume} = \frac{Bh}{3}$$

**Cone**

Right circular cone

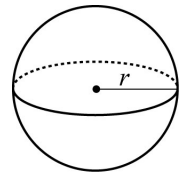
$$\text{volume} = \frac{\pi r^2 h}{3}$$

$$\text{curved surface area} = \pi r s$$

**Sphere**

$$\text{volume} = \frac{4\pi r^3}{3}$$

$$\text{area} = 4\pi r^2$$

**Scale**

$$\text{area scale factor} = (\text{length scale factor})^2$$

$$\text{volume scale factor} = (\text{length scale factor})^3$$

TRIGONOMETRY Right-angled triangle

Definitions

$$\sin v = \frac{a}{c}$$

$$\cos v = \frac{b}{c}$$

$$\tan v = \frac{a}{b}$$

