Formulas for national tests in mathematics 1

PREFIXES

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

$$a^x a^y = a^{x+y} \qquad \frac{a^x}{a^y} = a^{x-y} \qquad \left(a^x\right)^y = a^{xy} \qquad a^{-x} = \frac{1}{a^x}$$

$$a^x b^x = (ab)^x \qquad \frac{a^x}{b^x} = \left(\frac{a}{b}\right)^x \qquad a^{\frac{1}{n}} = \sqrt[n]{a} \qquad a^0 = 1$$

FUNCTIONS

Straight line

$$y = kx + m$$

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

$ax + by + c = 0$ where neither a nor b are zero

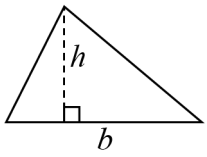
Exponential function $y = Ca^x$ where $a > 0$ and $a \neq 1$

Power function $y = Cx^a$

GEOMETRY

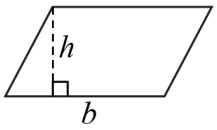
Triangle

$$A = \frac{bh}{2}$$



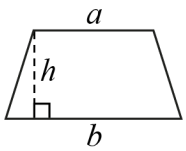
Parallelogram

$$A = bh$$



Parallel trapezium

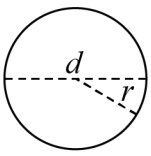
$$A = \frac{h(a+b)}{2}$$



Circle

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

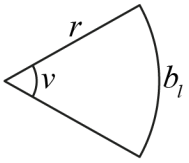
$$C = 2\pi r = \pi d$$



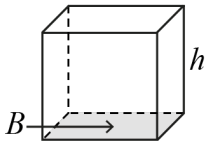
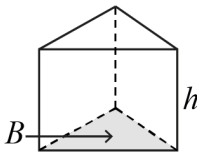
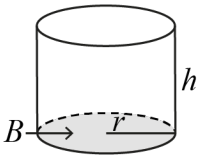
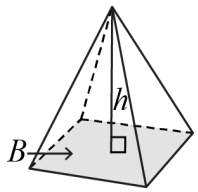
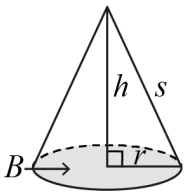
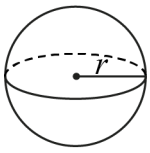
Circle sector

$$A = \frac{v}{360°} \cdot \pi r^2$$

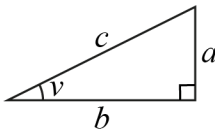
$$b_l = \frac{v}{360°} \cdot 2\pi r$$



Gäller från och med 2021-07-01

Cuboid	$V = Bh$	
Prism	$V = Bh$	
Cylinder Right circular cylinder	$V = Bh$ Lateral surface area $A_L = 2\pi rh$	
Pyramid	$V = \frac{Bh}{3}$	
Cone Right circular cone	$V = \frac{Bh}{3}$ Lateral surface area $A_L = \pi rs$	
Sphere	$V = \frac{4\pi r^3}{3}$ $A = 4\pi r^2$	
Scale	area scale factor = (length scale factor)^2 volume scale factor = (length scale factor)^3	

For a right-angled triangle with sides a, b and c



Pythagoras's theorem $a^2 + b^2 = c^2$

Trigonometry $\sin v = \frac{a}{c}$ $\cos v = \frac{b}{c}$ $\tan v = \frac{a}{b}$

VECTORS

For the vectors $\vec{u} = \left(a_x, a_y\right)$ and $\vec{v} = \left(b_x, b_y\right)$ and the scalar s

$\vec{u} + \vec{v} = \left(a_x + b_x, a_y + b_y\right)$ $\quad$ $\vec{u} - \vec{v} = \left(a_x - b_x, a_y - b_y\right)$

$s \cdot \vec{u} = \left(sa_x, sa_y\right)$ $\quad$ $\left|\vec{u}\right| = \sqrt{a_x^2 + a_y^2}$