Formula book

General Mathematics 2025

Queensland Government | QCAA Queensland Curriculum & Assessment Authority

Mensuration			
circumference of a circle	$C = 2\pi r$	area of a circle	$A = \pi r^2$
area of a parallelogram	$A = bh$	area of a trapezium	$A = \frac{1}{2}(a+b)h$
area of a triangle	$A = \frac{1}{2}bh$	total surface area of a cone	$S = \pi rs + \pi r^2$
total surface area of a cylinder	$S = 2\pi rh + 2\pi r^2$	surface area of a sphere	$S = 4\pi r^2$
volume of a cone	$V = \frac{1}{3}\pi r^2 h$	volume of a cylinder	$V = \pi r^2 h$
volume of a prism	$V = Ah$	volume of a pyramid	$V = \frac{1}{3}Ah$
volume of a sphere	$V = \frac{4}{3}\pi r^3$		

Shape and measurement			
perimeter of a sector	$P = 2r + \frac{\theta}{180}\pi r$	area of sector	$A = \frac{\theta}{360}\pi r^2$
Heron's rule	$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$, where $s = \frac{a+b+c}{2}$		

Data	
mean	$\bar{x} = \frac{\sum x}{n}$
median	$\left(\frac{n+1}{2}\right)^{\text{th}}$ data value
linear equation	$y = mx + c$
slope	$m = r\frac{s_y}{s_x}$
y-intercept	$c = \bar{y} - m\bar{x}$
outliers (identifying)	$Q_1 - 1.5 \times \text{IQR} \le x \le Q_3 + 1.5 \times \text{IQR}$

Sequences			
arithmetic sequence	$t_n = t_1 + (n-1)d$	geometric sequence	$t_n = t_1 r^{(n-1)}$

Earth geometry		
distance (km)	$D = 111.2 \times$ angular distance	$D = 111.2\cos\theta \times$ angular distance

Graphs and networks	
Euler's formula	$v + f - e = 2$

Trigonometry			
Pythagoras' theorem	$c^2 = a^2 + b^2$		
trigonometric ratios	$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}}$	$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$	$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$
cosine rule	$c^2 = a^2 + b^2 - 2ab\cos C$		
sine rule	$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$		
area of a triangle	$\text{area} = \frac{1}{2}bc\sin A$		

Finance		
dividend yield	$\frac{\text{dividend}}{\text{share price}} \times 100$	
price-to-earnings ratio	$\text{P/E ratio} = \frac{\text{market price per share}}{\text{annual earnings per share}}$	
simple interest	$I = Pin$	
compound interest	$A = P(1+i)^n$	
effective annual rate of interest	$i_{\text{effective}} = (1+i)^k - 1$	
recurrence relation for compound interest	$A_{n+1} = rA_n$	
recurrence relation for reducing balance loans	$A_{n+1} = rA_n - d$	
recurrence relation for annuities	$A_{n+1} = rA_n + d$	
annuity	$A_{PV} = d\left(\frac{1-(1+i)^{-n}}{i}\right)$	$A_{FV} = d\left(\frac{(1+i)^n - 1}{i}\right)$
perpetuity	$A = \frac{d}{i}$	