
Formula book

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

Measurement	
arc length	$l = \frac{\theta}{180}\pi r$
area of sector	$A = \frac{\theta}{360}\pi r^2$

Finance				
simple interest	$I = Pin$	$P = \frac{I}{in}$	$i = \frac{I}{Pn}$	$n = \frac{I}{Pi}$
compound interest	$A = P(1+i)^n$			

Trigonometry

Pythagoras' theorem	$c^2 = a^2 + b^2$	$a^2 = c^2 - b^2$	$b^2 = c^2 - a^2$
trigonometric ratios	$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$	$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$	$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$

Location and time

speed	$s = \frac{d}{t}$
distance	$d = s \times t$
time	$t = \frac{d}{s}$

Data

mean	$\bar{x} = \frac{\sum x}{n}$
range	range = highest score – lowest score
interquartile range	$IQR = Q_3 - Q_1$
equation of line	$y = mx + c$

Conversions

length unit conversion	<pre> graph TD km((km)) -- "×1000" --> m((m)) m -- "÷1000" --> km m -- "×100" --> cm((cm)) cm -- "÷100" --> m cm -- "×10" --> mm((mm)) mm -- "÷10" --> cm </pre>
area unit conversion	<pre> graph TD km2((km²)) -- "×1000²" --> m2((m²)) m2 -- "÷1000²" --> km2 m2 -- "×100²" --> cm2((cm²)) cm2 -- "÷100²" --> m2 cm2 -- "×10²" --> mm2((mm²)) mm2 -- "÷10²" --> cm2 km2 -- "×100" --> ha((ha)) ha -- "÷100" --> km2 ha -- "×100²" --> m2 m2 -- "÷100²" --> ha </pre>
volume unit conversion	<pre> graph TD km3((km³)) -- "×1000³" --> m3((m³)) m3 -- "÷1000³" --> km3 m3 -- "×100³" --> cm3((cm³)) cm3 -- "÷100³" --> m3 cm3 -- "×10³" --> mm3((mm³)) mm3 -- "÷10³" --> cm3 </pre>
mass unit conversion	<pre> graph TD tonne((tonne)) -- "×1000" --> kg((kg)) kg -- "÷1000" --> tonne kg -- "×1000" --> g((g)) g -- "÷1000" --> kg g -- "×1000" --> mg((mg)) mg -- "÷1000" --> g </pre>
capacity unit conversion	<pre> graph TD ML((ML)) -- "×1000" --> kL((kL)) kL -- "÷1000" --> ML kL -- "×1000" --> L((L)) L -- "÷1000" --> kL L -- "×1000" --> mL((mL)) mL -- "÷1000" --> L </pre>



© State of Queensland (QCAA) 2025, Licence: <https://creativecommons.org/licenses/by/4.0/> |

Copyright notice: www.qcaa.qld.edu.au/copyright — lists the full terms and conditions, which specify certain exceptions to the licence. |

Attribution: © State of Queensland (QCAA) 2025