

# MATHEMATICS: UNITS 2C AND 2D FORMULA SHEET 2012

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This document is valid for teaching and examining until 31 December 2012.

Mathematics 2C and 2D Formula Sheet updated July 2012

**Numbers and algebra**

Index laws: For any numerical value  $a \neq 0$ , and integers  $m$  and  $n$ ,

$$a^m a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

Simple interest:  $I = Prt$ , where  $P$  is the principal,  $r$  is the rate per year and  $t$  is the time in years

**Space and measurement**

Gradient of line,  $m$ , through the points  $(x_1, y_1)$  and  $(x_2, y_2)$  is given by  $m = \frac{y_2 - y_1}{x_2 - x_1}$

Distance  $d$ , between the points  $(x_1, y_1)$  and  $(x_2, y_2)$  is given by  $d = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$

Lines are perpendicular if  $m_1 m_2 = -1$

In a right triangle:  $\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$   $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$   $\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$

Pythagoras' Theorem: In a right triangle  $ABC$ , where  $a$ ,  $b$  are the short sides and  $c$  is the hypotenuse  
 $c^2 = a^2 + b^2$

In any triangle  $ABC$ :

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

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

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

$$A = \frac{1}{2} ab \sin C, \text{ where } A \text{ is the area}$$

See next page

**Space and measurement**

Circle:  $C = 2\pi r = \pi D$ , where  $C$  is the circumference,  $r$  is the radius and  $D$  is the diameter  
 $A = \pi r^2$ , where  $A$  is the area

Triangle:  $A = \frac{1}{2} bh$ , where  $b$  is the base and  $h$  is the perpendicular height

Parallelogram:  $A = bh$

Trapezium:  $A = \frac{1}{2}(a + b)h$ , where  $a$  and  $b$  are the lengths of the parallel sides and  $h$  is the perpendicular height

Prism:  $V = Ah$ , where  $V$  is the volume,  $A$  is the area of the base and  $h$  is the perpendicular height

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

Cylinder:  $S = 2\pi rh + 2\pi r^2$ , where  $S$  is the total surface area  
 $V = \pi r^2 h$

Cone:  $S = \pi rs + \pi r^2$ , where  $s$  is the slant height  
 $V = \frac{1}{3} \pi r^2 h$

Sphere:  $S = 4\pi r^2$   
 $V = \frac{4}{3} \pi r^3$

**Chance and data**

Probability: For any event  $A$  and its complement  $\bar{A}$   
 $P(A) + P(\bar{A}) = 1$

*Note: Any additional formulas identified by the examination panel as necessary will be included in the body of the particular question.*