

# Facts to Remember

**Unit 1**  $a^n = a \times a \times a \times \dots \times a$  ( $n$  times)  $a^1 = a$

$$a^0 = 1 \qquad a^n \times a^m = a^{n+m}$$

$$a^n \div a^m = a^{n-m} \qquad (a^n)^m = a^{n \cdot m}$$

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

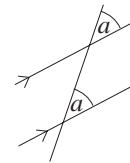
Standard form  $A \times 10^n$  where  $1 \leq A < 10$ ,  $n$  an integer.

**Unit 2**  $(-a) \times b = -ab$   $(-a) \times (-b) = ab$

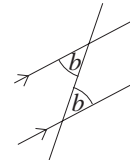
**Unit 3** The sum of interior angles in a triangle is  $180^\circ$ .

The sum of interior angles in a quadrilateral is  $360^\circ$ .

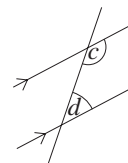
Corresponding angles are equal, shown as  $(a)$  in diagram.



Alternate angles are equal, shown as  $(b)$  in diagram.



Supplementary angles add up to  $180^\circ$ , shown as  $(c)$  and  $(d)$  in diagram.

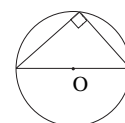


Angle around a complete circle is  $360^\circ$ .

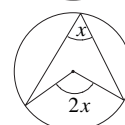
Angle around a point on a straight line is  $180^\circ$ .

Bearings  $\left\{ \begin{array}{l} \text{are always measured clockwise from North.} \\ \text{are expressed as 3 digits.} \end{array} \right.$

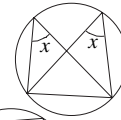
The angle on the perimeter subtended from a diameter of a circle is  $90^\circ$ .



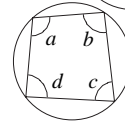
Angle subtended by an arc of a circle at the centre is twice the angle subtended on the perimeter.



Angles subtended at the circumference by a chord, on the same side as the chord, are equal.

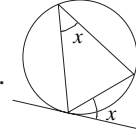


In cyclic quadrilaterals (when all four vertices lie on a circle), opposite angles sum to  $180^\circ$ .



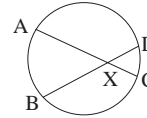
$$a + c = b + d = 180^\circ$$

The angle between a tangent and a chord equals an angle on the circumference subtended by the same chord.



For two chords, AC and BD, intersecting at X,

$$AX \cdot CX = BX \cdot DX.$$



#### Unit 4

Pythagoras' Theorem:  $a^2 + b^2 = c^2$

$$\sin x = \frac{\text{opp}}{\text{hyp}}, \quad \cos x = \frac{\text{adj}}{\text{hyp}}, \quad \tan x = \frac{\text{opp}}{\text{adj}}$$

$$\text{Sine Rule: } \frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

$$\text{Cosine Rule: } c^2 = a^2 + b^2 - 2ab \cos C$$

$$\sin 0 = \sin 180^\circ = \sin 360^\circ = 0$$

Angle	$0^\circ$	$30^\circ$	$45^\circ$	$60^\circ$	$90^\circ$	$180^\circ$	$270^\circ$	$360^\circ$
sin	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1	0	-1	0
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0	-1	0	1
tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	$\infty$	0	$\infty$	0

#### Unit 5

Sum of all probabilities = 1.

$$p(\text{event occurring}) + p(\text{event not occurring}) = 1.$$

If there are  $n$  equally likely outcomes, then  $p(\text{particular outcome}) = \frac{1}{n}$ .

If events A and B are independent,  $p(\text{A and B}) = p(\text{A}) \times p(\text{B})$ .

If events A and B are mutually exclusive,  $p(\text{A or B}) = p(\text{A}) + p(\text{B})$ .

#### Unit 6

Real numbers are rational or irrational, not both.

Numbers which can be expressed as  $\frac{m}{n}$  for integers  $m$  and  $n$  ( $n \neq 0$ ) are rational numbers.

Decimals are rational numbers, and can be either terminating

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(e.g.  $0.75 = \frac{3}{4}$ ) or recurring (e.g.  $0.111\dots = \frac{1}{9}$ ).