

Trigonometric Formula

FORMULAE LIST

Circle:

The equation $x^2 + y^2 + 2gx + 2fy + c = 0$ represents a circle centre $(-g, -f)$ and radius $\sqrt{g^2 + f^2 - c}$.

The equation $(x-a)^2 + (y-b)^2 = r^2$ represents a circle centre (a, b) and radius r .

Scalar Product:

$\mathbf{a} \cdot \mathbf{b} = |\mathbf{a}| |\mathbf{b}| \cos \theta$, where θ is the angle between \mathbf{a} and \mathbf{b}

or $\mathbf{a} \cdot \mathbf{b} = a_1 b_1 + a_2 b_2 + a_3 b_3$ where $\mathbf{a} = \begin{pmatrix} a_1 \\ a_2 \\ a_3 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} b_1 \\ b_2 \\ b_3 \end{pmatrix}$.

Trigonometric formulae:

$$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$\sin 2A = 2 \sin A \cos A$$

$$\cos 2A = \cos^2 A - \sin^2 A$$

$$= 2 \cos^2 A - 1$$

$$= 1 - 2 \sin^2 A$$

Table of standard derivatives:

$f(x)$	$f'(x)$
$\sin ax$	$a \cos ax$
$\cos ax$	$-a \sin ax$

Table of standard integrals:

$f(x)$	$\int f(x) dx$
$\sin ax$	$-\frac{1}{a} \cos ax + c$
$\cos ax$	$\frac{1}{a} \sin ax + c$

Essential Skills 11

The skills in this series of worksheets appear frequently.

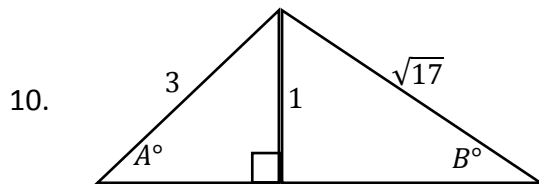
These are the GIFTS you must take to succeed

Trigonometric Formula

Calculate the exact value in each:



1. $\sin 75^\circ$ given that $75^\circ = 30^\circ + 45^\circ$
2. $\cos 15^\circ$ given that $15^\circ = 60^\circ - 45^\circ$
3. Given $\tan x^\circ = \frac{3}{4}$, find $\sin 2x^\circ$
4. Given $\tan x^\circ = \frac{2}{3}$, find $\cos 2x^\circ$
5. Given $\tan A^\circ = \frac{1}{2}$, find $\sin(A + 30)^\circ$
6. Given $\sin P^\circ = \frac{12}{13}$, find $\cos(P + 30)^\circ$
7. Given $\cos B^\circ = \frac{1}{\sqrt{10}}$, find $\sin(B - 45)^\circ$
8. Given $\tan x^\circ = \frac{2}{5}$, find $\sin 2x^\circ$
9. Given $\tan A^\circ = \frac{3}{4}$ and $\tan B^\circ = \frac{1}{2}$, find $\sin(A + B)^\circ$



Show that $\cos(A - B)^\circ = \frac{8\sqrt{2}+1}{3\sqrt{17}}$



APPLYING QUESTIONS

1. Given that $\cos 2x^\circ = \frac{7}{25}$ find the value of $\sin x^\circ$. ($0 < x < 90^\circ$)

2.

(a) Given that $3A = 2A + A$ find the value of $\sin 3A^\circ$

(b) Hence, or otherwise, find the value of $\tan 3A^\circ$

Essential Skills 11 - Answers

1	$\frac{1 + \sqrt{3}}{2\sqrt{2}}$
2	$\frac{1 + \sqrt{3}}{2\sqrt{2}}$
3	$\frac{24}{25}$
4	$\frac{5}{13}$
5	$\frac{2 + \sqrt{3}}{2\sqrt{5}}$
6	$\frac{5\sqrt{3} - 12}{26}$
7	$\frac{1}{\sqrt{5}}$
8	$\frac{20}{29}$
9	$\frac{2}{\sqrt{5}}$
10	<i>Proof</i>
AQ	(1) $\frac{3}{5}$ (2) (a) $-\frac{2}{5\sqrt{5}}$ (b) $\frac{2}{11}$

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