

Sheet A - 10 Questions

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:

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

Sheet A

Non-Calculator Question	Answer
1) State the equation used to find the distance between 2 points.	
2) How do you prove lines are perpendicular?	
3) In a recurrence relation, how do you know a limit exists?	
4) If $f(x) = \frac{1}{x-2}$, find $f^{-1}(x)$.	
5) Prove $(x-1)$ is a factor of $f(x) = x^3 + 5x^2 + 2x - 8$	
6) If $\sin x = \frac{6}{10}$, find $\cos 2x$.	
7) Find $\int_0^2 3x^2 - 2x + 5 dx$.	
8) Given an angle a straight line makes with the positive direction of the x axis, state an equation that can be used to find the gradient of the line.	
9) Write the following in degrees: a) $\frac{\pi}{6}$ b) $\frac{2\pi}{3}$ c) $\frac{5\pi}{4}$	
10) State the centre and the radius of the following circle: $x^2 + y^2 - 4x + 6y + 11 = 0$	