

Equation of a Tangent to a Curve

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 4

The skills in this series of worksheets appear frequently.

These are the GIFTS you must take to succeed



Tangent to a Curve (Non Calculator)

Find the equation of the tangent to the curve at the given point:

1. $y = 3x^2 - 4; x = 2$

2. $y = 6x - x^3; x = -2$

3. $y = 4\sqrt{x}; x = 9$

4. $f(x) = x^3 - 4x + 3; x = -1$

5. $y = x^3 - 2x + 5; x = 2$

6. $y = 5x^3 - 12x; x = 1$

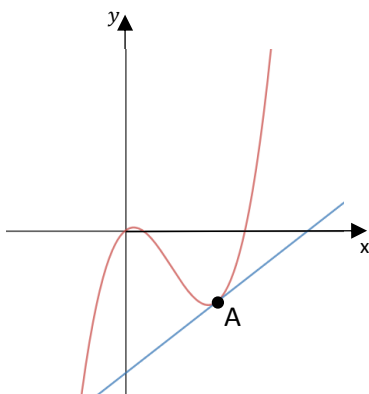
7. $f(x) = (x - 3)^2; x = 4$

8. $y = x^2(2x - 1); x = -1$

9. $y = 2\sqrt{x}; x = 25$

10. $y = 3 - \frac{2}{x}; x = -2$

APPLYING QUESTION



The tangent to the curve $y = x^3 - 3x^2 + x$ makes an angle of 45° with the positive direction of the x -axis.

Establish the co-ordinates of point A.

Essential Skills 4 - Answers

1	$y - 12x + 16 = 0$
2	$y + 6x + 16 = 0$
3	$3y - 2x - 18 = 0$
4	$y + x - 5 = 0$
5	$y - 10x + 11 = 0$
6	$y - 3x + 10 = 0$
7	$y - 2x + 7 = 0$
8	$y - 8x - 5 = 0$
9	$5y - x - 25 = 0$
10	$2y - x - 8 = 0$
AQ	$A(2, -2)$

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