DIFFERENTIATION & FUNCTIONS (Q 6, 7 & 8, PAPER 1)

LESSON NO. 7: TANGENTS

2007

6 (c) Let $f(x) = (5x-2)^4$ for $x \in \mathbf{R}$.

(i) Find $f'(x)$, the derivative of $f(x)$.

(ii) Find the co-ordinates of the point on the curve $y = f(x)$ at which the slope of the tangent is 20.

2003

8 (c) Let $f(x) = x^3 + 2x^2 - 1$.

(i) Find $f'(x)$, the derivative of $f(x)$.

(ii) L is the tangent to the curve $y = f(x)$ at $x = -\frac{2}{3}$.
Find the slope of L.

(iii) Find the two values of x at which the tangents to the curve $y = f(x)$ are perpendicular to L.

2000

6 (c) Let $g(x) = (2x+3)(x^2-1)$ for $x \in \mathbf{R}$.

(i) For what two values of x is the slope of the tangent to the curve of $g(x)$ equal to 10?

(ii) Find the equations of the two tangents to the curve of $g(x)$ which have slope 10.

1999

6 (c) Let $f(x) = x^3 - 6x^2 + 12$ for $x \in \mathbf{R}$.
Find the derivative of $f(x)$.
At the two points (x_1, y_1) and (x_2, y_2), the tangents to the curve $y = f(x)$ are parallel to the x axis, where $x_2 > x_1$.
Show that

(i) $x_2 - x_1 = 4$

(ii) $y_2 = y_1 - 32$.

1997

8 (b) Find the equation of the tangent to the curve

$$y = x^3 - 4x + 7$$

at the point where $x = 1$.

1996

6 (c) Let $f(x) = \dfrac{1}{x-2}$, for $x \in \mathbf{R}$ and $x \neq 2$.

Find the derivative of $f(x)$.

Tangents to $f(x)$ make an angle of 135° with the x axis.

Find the coordinates of the points on the curve of $f(x)$ at which this occurs.

ANSWERS

2007 6 (c) (i) $f'(x) = 20(5x-2)^3$ (ii) $(\frac{3}{5}, 1)$

2003 8 (c) (i) $3x^2 + 4x$ (ii) $-\frac{4}{3}$ (iii) $-\frac{3}{2}, \frac{1}{6}$

2000 6 (c) (i) $-2, 1$ (ii) $10x - y + 17 = 0,\ 10x - y - 10 = 0$

1999 6 (c) $3x^2 - 12x;\ x_1 = 0,\ x_2 = 4;\ y_1 = 12,\ y_2 = -20$

1997 8 (b) $x + y - 5 = 0$

1996 6 (c) $-\dfrac{1}{(x-2)^2}$; (1, −1), (3, 1)