

Introduction to Differentiation – Section Test

1. What is the gradient of the curve $y = 3x^2 - 4$ at the point $(2, 8)$?
2. For $y = x^3 - 2x^2 + x - 3$, what is the rate of change of y with respect to x when $x = -1$?
3. A graph has equation $y = 2x^2 - 3x + 1$.
The value of x for which the gradient of the graph is 2 is given in its simplest form as a fraction $\frac{a}{b}$ where a and b are positive integers. What are the values for a and b ?
4. The derivative of $(2x - 1)(x^2 - 3)$ is:
(a) $6x^2 - 2x - 6 + c$
(b) $6x^2 - 2x - 6$
(c) $4x$
(d) $\frac{1}{4}x^4 - \frac{1}{3}x^3 - 3x^2 + 3x + c$

Questions 5 and 6 are about the curve $y = x^3 - x + 3$.

5. The equation of the tangent to the curve at the point $(1, 3)$ is:

$$y = \boxed{}x + \boxed{}$$

6. The equation of the normal to the curve at the point $(1, 3)$ is:

$$\boxed{}y + x = \boxed{}$$

7. The normal at the point P to the curve $y = 2 - x^3$ has gradient 3. The x -coordinate of P is:

- (a) 1
(b) $\frac{1}{3}$
(c) $-\frac{1}{3}$ or $\frac{1}{3}$
(d) -1 or 1

8. The coordinates of the points on the curve $y = x^3 - 2x^2$ where the gradient is -1 are:

- (a) $(1, -1)$ and $(\frac{1}{3}, -\frac{5}{27})$
(b) $(1, -1)$ and $(\frac{1}{3}, -1)$
(c) $(1, -1)$ and $(-\frac{1}{3}, \frac{5}{27})$
(d) $(-1, 1)$ and $(\frac{1}{3}, -\frac{5}{27})$

9. The tangent to the curve $y = x^3 - 2x^2 + 4$ at the point $(2, 4)$ meets the coordinate axes at the points X and Y .

The area of triangle OXY ?

10. The normal to the curve $y = 2x^2 - x + 3$ at the point $P(1, 4)$ meets the curve again at the point Q .

The x -coordinate of Q is

- (a) $-\frac{2}{3}$
(b) 1
(c) 13
(d) $-\frac{1}{3}$