



SEKOLAH BUKIT SION – HIGH SCHOOL

ADDITIONAL MATHEMATICS

CHAPTER TEST: DIFFERENTIATION

NAME		DATE	
CLASS		SCORE	/45

1. Find $\frac{dy}{dx}$ of the following. Express your answer in positive index, if necessary.

(a) $y = x^3 - 27x + 3$ [2]

(b) $y = \frac{1}{3}(1 - 2x)^9$ [2]

(c) $y = x(x - 2)^3$ [3]

(d) $y = \frac{x^2 - 5}{3 + x}$ [3]

(e) $y = 5x^2 + \frac{7}{x} - 2\sqrt{x}$ [2]

2. The equation of the curve is $y = 2x(-x^2 - 3x + 1)$.

(a) Find the gradient of the curve at $x = 0$. [2]

(b) Write down the equation of the line tangent to the curve at $x = 1$. [3]

(c) Write down the equation of the normal line at $x = -2$. [3]

3. Find $\frac{d^2y}{dx^2}$.

(a) $y = \frac{1}{12}x^4 - \frac{5}{6}x^3 + 3x^2 + \frac{1}{2}$ [2]

(b) $y = \frac{x^3 + 3}{2x^2}$ [3]

(c) $y = 7x^2 + 3x - 9$ [1]

4. Find the coordinates of the stationary point/points of the curve $y = \frac{x^2 - 4x + 9}{x^2 + 2}$. [5]

5. Find the value of k for which $\frac{d}{dx} \left(\frac{2x-3}{x+5} \right) = \frac{k}{(x+5)^2}$. [3]

6. Given that the gradient of the tangent to the curve $y = ax^3 + bx^2 + 3$ at the point $(1, 4)$ is 7,

(a) calculate a and b . [3]

(b) write down the equation of the normal to the curve at $(1, 4)$. [2]

7. Determine the coordinates of the point where the gradient of the tangent to the curve $y = 1 - 3x^2$ is 12. [2]

8. Differentiate $(5x + 3)^5 (2x^2 - 7x)^{10}$ with respect to x . [4]