(c) Find the slope and hence the equation of the tangent to the curve $y = (3x - 2)(1 - x^2)$ at the point $(0, -2)$.

(d) Find the coordinates of the local maximum of the curve $y = 4x^3 - 3x + 4$.

4. (a) If $y = \dfrac{x^2 - 4}{2x - 3}$, find the value of $\dfrac{dy}{dx}$ when $x = 0$.

(b) If $y = (2x - 1)(x^2 - 2)$, find the values of x for which $\dfrac{dy}{dx} = 0$.

(c) Find the slope of the tangent to the curve $y = (2x^2 - 4x)^3$ at $x = 1$.

(d) The distance s metres travelled by a body in t seconds is given by the formula

$$s = 3 - 6t + 2t^3.$$

(i) Find the speed of the body after 2 seconds.
(ii) Show that the body is stopped when $t = 1$.
(iii) Find the acceleration after 3 seconds.

5. (a) Differentiate $2 - 3x - x^2$ with respect to x from first principles.

(b) Find the point on the curve $y = 4x - x^2$ at which the slope of the tangent to the curve is 1.

(c) Find the coordinates of the local maximum of the function

$$y = x^3 - 9x^2 + 24x - 20.$$

6. (a) If $y = (2x - 3)^3$, find the value of $\dfrac{dy}{dx}$ when $x = 1$.

(b) Show that $(1, -5)$ is a point of the curve $y = 2x^2 - 5x - 2$, and find the equation of the tangent to the curve at this point.

(c) Show that the curve $y = x^3 - 3x + 5$ has a local minimum at the point $(1, 3)$. Find the coordinates of the local maximum.

7. (a) Differentiate $3x^2 - x + 4$ with respect to x from first principles.

(b) If $y = (1 - 3x^2)^6$, find the value of $\dfrac{dy}{dx}$ when $x = -1$.

(c) Find the slope and hence the equation of the tangent to the curve $y = (1 - x^2)(2x - 3)$ at the point $(0, -3)$.

(d) A particle moves along a straight line so that its distance s metres from a fixed point o after t seconds is given by $s = t^3 + t^2 + 2t - 5$. Find
(i) its speed after 1 second
(ii) the acceleration when $t = 2$
(iii) after how many seconds is the acceleration $8\ \text{m/sec}^2$?

8. (a) If $y = (x^2 - 2)(3x - 1)$, find the value of $\dfrac{dy}{dx}$ at $x = 0$.

(b) Differentiate $\dfrac{1}{x - x^2}$ with respect to x.