ST ANDREW'S ACADEMY

MATHEMATICS **DEPARTMENT**

HIGHER HOME EXERCISE – DIFFERENTIATION 2

1. The point P(x, y) lies on the curve with equation $y = 6x^2 - x^3$.

(a) Find the value of x for which the gradient of the tangent at P is 12.

(b) Hence find the equation of the tangent at P.

2. A function, f, is defined on the set of real numbers by $f(x) = x^3 - 7x - 6$.
Determine whether f is increasing or decreasing when $x = 2$.

3. Given that $y = 3\sin(x) + \cos(2x)$, find $\frac{dy}{dx}$.

4. Given that $f(x) = (5x - 4)^{\frac{1}{2}}$, evaluate $f'(4)$.