PRIMITIVE FUNCTIONS

1 Find the primitive of:

(a) $6x^2 - 4x + 5$ **(b)** $3 + 5x + x^2 - 3x^3$ **(c)** $x^2 - 1$

2 If $f'(x) = (x-1)(x-2)$, indicate whether each statement below is correct or incorrect.

(a) $f'(x) = x^2 - 3x + 2$ **(b)** $f(x) = \frac{x^3}{3} - \frac{3x^2}{2} + 2x + C$

(c) $f(x) = (x-1)^2(x-2)^2 + C$ **(d)** $f(x) = \frac{(x-1)^2(x-2)^2}{4} + C$

3 Find an expression for $f(x)$ given:

(a) $f'(x) = (2x+1)^2$ **(b)** $f'(x) = 5$ **(c)** $f'(x) = x^2 + 3x$

5 Express y in terms of x, given that:

(a) $\frac{dy}{dx} = 3 + 2x - 3x^2$ **(b)** $\frac{dy}{dx} = x^3 + 2x^2$ **(c)** $\frac{dy}{dx} = x^4 - x^3$

7 Find $f(x)$ given $f'(x) = 2x - 2$ and $f(1) = 4$.

9 At all points on a certain curve, $\frac{dy}{dx} = 4x - 6$. The point $(2, 4)$ is on the curve. Find the equation of the curve.

10 Find the equation of a curve that passes through the point $(3, 3)$ and for which the gradient function at any point $P(x, y)$ is $3x^2 - 2x + 3$.

12 Find the equation of a curve given that $\frac{dy}{dx} = 2x + b$ at any point P and that when $x = 3$, $\frac{dy}{dx} = 2$ and $y = -3$.

18 If velocity v is the rate of change of distance d as a function of time t, find the distance function if $v = 3t^2 + 4$ and $d = 0$ when $t = 0$.