Given that $\displaystyle\int_1^4 (3x^2 + ax - 5)\ dx = 18,$ find the value of the constant a.
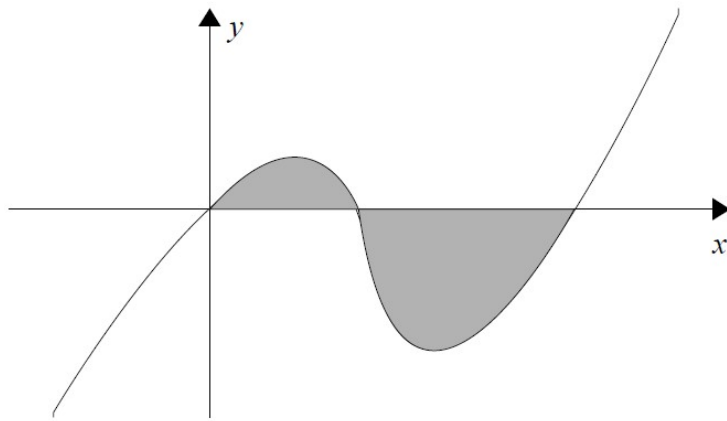
The sketch shows the curve $y = x(x - 2)(x - 5)$

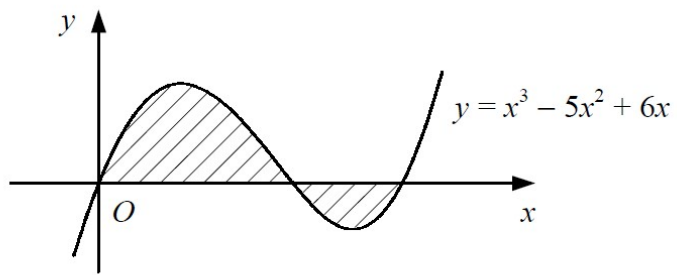(a) Write down the values of x where the curve crosses the x axis. **(1)**

(b) Find the area of the shaded region. **(8)**

Given that $\int_{-1}^{k} (3x^2 - 12x + 9)\ dx = 16,$ find the value of the non-zero constant k.

Find $\displaystyle\int_{1}^{3} (x+4)(x-3) \ dx$

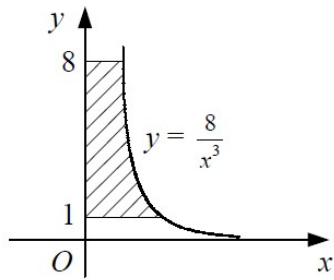The diagram shows the curve with the equation $y = x^3 - 5x^2 + 6x$.

a Find the coordinates of the points where the curve crosses the x-axis.

b Show that the total area of the shaded regions enclosed by the curve and the x-axis is $3\frac{1}{12}$.

$f'(x) = 6x^2 - 3x + 8$

Given that the point (1, 8) lies on $y = f(x)$

Find an expression for $f(x)$

a Evaluate $\int_1^2 \dfrac{8}{x^3} \, dx$.

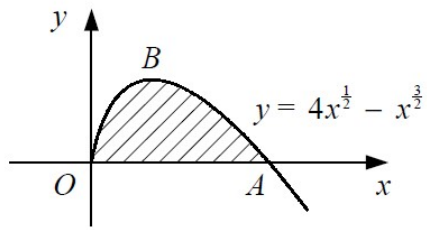The diagram shows the curve with the equation $y = \dfrac{8}{x^3}$, $x > 0$.

b Using your answer to part **a**, find the area of the shaded region bounded by the curve, the lines $y = 1$ and $y = 8$ and the y-axis.

The curve C with equation $y = f(x)$ is such that

$$\frac{dy}{dx} = 3x^2 - 4x - 1.$$

Given that the tangent to the curve at the point P with x-coordinate 2 passes through the origin, find an equation for the curve.

(7)

The diagram shows the curve with the equation $y = 4x^{\frac{1}{2}} - x^{\frac{3}{2}}$.

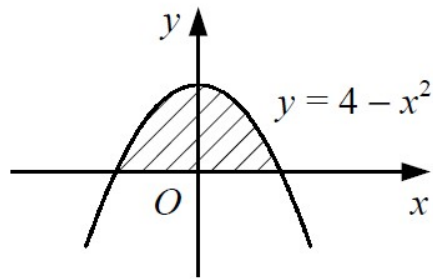The curve meets the x-axis at the origin, O, and at the point A.

a Find the coordinates of the point A. **(2)**

c Find the area of the shaded region enclosed by the curve and the x-axis. **(4)**

Given that

$$\int_1^k \left(3 - \frac{4}{x^2}\right)\, dx = 6,$$

and that $k > 1$, find the value of the constant k.

Find $\int (x+4)(x-3)\ \mathrm{d}x$

The diagram shows the curve with the equation $y = 4 - x^2$.

a Find the coordinates of the points where the curve crosses the x-axis.

b Find the area of the shaded region enclosed by the curve and the x-axis.