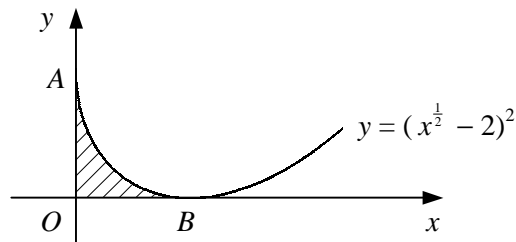


1



The diagram shows the curve with the equation $y = (x^{\frac{1}{2}} - 2)^2$. The curve meets the y-axis at the point A and the x-axis at the point B.

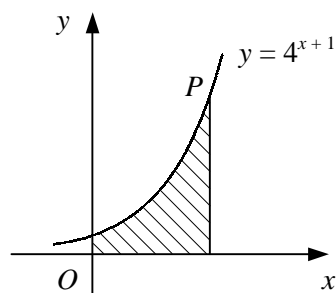
a Find the coordinates of the points A and B. (3)

b Find the area of the shaded region enclosed by the curve and the coordinate axes. (6)

2 Evaluate

$$\int_1^2 \frac{3x^3 + 1}{2x^2} dx. \quad (5)$$

3



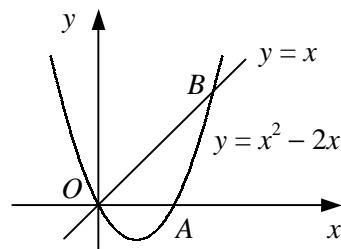
The diagram shows the curve with equation $y = 4^{x+1}$.

The point P on the curve has y-coordinate 32.

a Find the x-coordinate of P. (3)

The shaded region is bounded by the curve, the coordinate axes and the line through P parallel to the y-axis.

4



The diagram shows the curve $y = x^2 - 2x$ and the line $y = x$. The curve crosses the x-axis at the origin, O, and at the point A. The line intersects the curve at O and at the point B.

a Find the coordinates of the points A and B. (4)

b Find the area of the region enclosed by the curve and the x-axis. (5)

c Show that the area of the region enclosed by the curve and the line $y = x$ is $\frac{9}{2}$. (5)

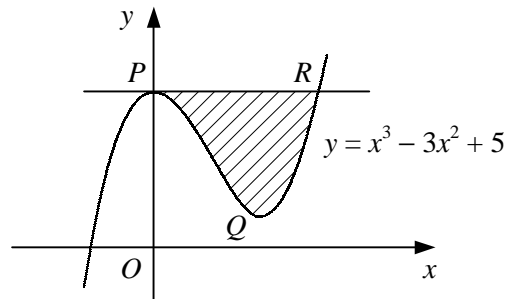
6 Given that

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

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

(7)

7



The diagram shows the curve with the equation $y = x^3 - 3x^2 + 5$. The curve is stationary at the point $P(0, 5)$ and at the point Q .

a Find the coordinates of the point Q .

(5)

The straight line passing through the point P parallel to the x -axis intersects the curve again at the point R .

b Find the coordinates of the point R .

(2)

c Find the area of the shaded region enclosed by the curve and the straight line PR .

(7)