

The curve with equation $y = f(x)$ also passes through the point $P(4, 12)$

Given that

$$f'(x) = \frac{1}{4}x^3 - 8x^{\frac{1}{2}}$$

(b) find $f(x)$ giving the coefficients in simplest form.

(5)

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4. Find

$$\int \frac{(3\sqrt{x} + 2)(x - 5)}{4\sqrt{x}} dx$$

writing each term in simplest form.

(6)

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1. Find

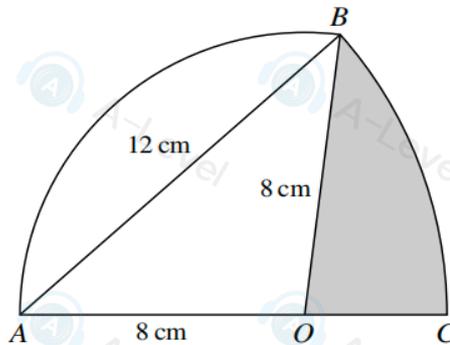
$$\int \left(10x^4 - \frac{3}{2x^3} - 7 \right) dx$$

giving each term in simplest form.

(3)

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In the diagram, arc AB is part of a circle with centre O and radius 8 cm. Arc BC is part of a circle with centre A and radius 12 cm, where AOC is a straight line.

(a) Find angle BAO in radians.

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8. In this question you must show all stages of your working.
Solutions relying entirely on calculator technology are not acceptable.

A curve has equation $y = f(x)$, $x > 0$

The point $P(4, 12)$ lies on the curve.

Given that

- $f'(x) = 3\sqrt{x} + kx^2$ where k is a constant
- the equation of the tangent to the curve at P has equation $y = 10x + c$ where c is a constant

(a) (i) show that $k = \frac{1}{4}$

(ii) find the value of c (4)

(b) Hence find the value of $f''(x)$ at P . (3)

(c) Find $f(x)$. (4)

6. In this question you must show all stages of your working.
Solutions relying entirely on calculator technology are not acceptable.

The curve C has equation $y = f(x)$, $x > 0$

Given that

- the point $P(4, -5)$ lies on C
- $f'(x) = \frac{2x^2 + ax + b}{4\sqrt{x}}$, where a and b are constants
- the gradient of the tangent to C at P is 7

(a) show that $4a + b = 24$ (2)

Given also that $a + b = -9$

(b) find, in simplest form, $f(x)$ (7)

Curve C is transformed to the curve with equation $y = f(x - 3)$

Given that point P is transformed to the point Q ,

(c) state the coordinates of Q . (1)

1. Find

$$\int 12x^3 + \frac{1}{6\sqrt{x}} - \frac{3}{2x^4} dx$$

giving each term in simplest form.

(5)

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6.

In this question you must show all stages of your working.
Solutions relying entirely on calculator technology are not acceptable.

The curve C has equation $y = f(x)$, $x > 0$

Given that

- the point $P(4, -5)$ lies on C
- $f'(x) = \frac{2x^2 + ax + b}{4\sqrt{x}}$, where a and b are constants
- the gradient of the tangent to C at P is 7

(a) show that

$$4a + b = 24$$

(2)

Given also that $a + b = -9$ (b) find, in simplest form, $f(x)$

(7)

Curve C is transformed to the curve with equation $y = f(x - 3)$ Given that point P is transformed to the point Q ,(c) state the coordinates of Q .

(1)

4. Find

$$\int \frac{4x^2 + 1}{2\sqrt{x}} dx$$

giving the answer in its simplest form.

(5)

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