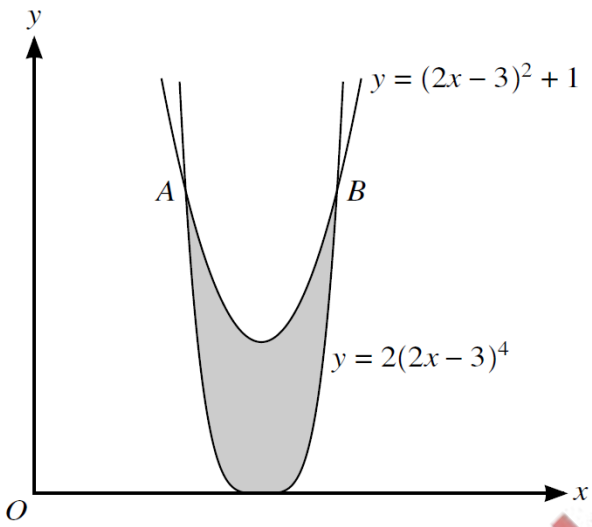
**1.** Nov/2023/Paper_9709/11/No.8




The diagram shows the curves with equations $y = 2(2x - 3)^4$ and $y = (2x - 3)^2 + 1$ meeting at points $A$ and $B$.

**(a)** By using the substitution $u = 2x - 3$ find, by calculation, the coordinates of $A$ and $B$. [4]

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**(b)** Find the exact area of the shaded region. [5]

**2.** Nov/2023/Paper_9709/12/No.3

The equation of a curve is such that $\frac{dy}{dx} = \frac{1}{2}x + \frac{72}{x^4}$. The curve passes through the point $P(2, 8)$.

**(a)** Find the equation of the normal to the curve at $P$. [2]

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**(b)** Find the equation of the curve. [4]

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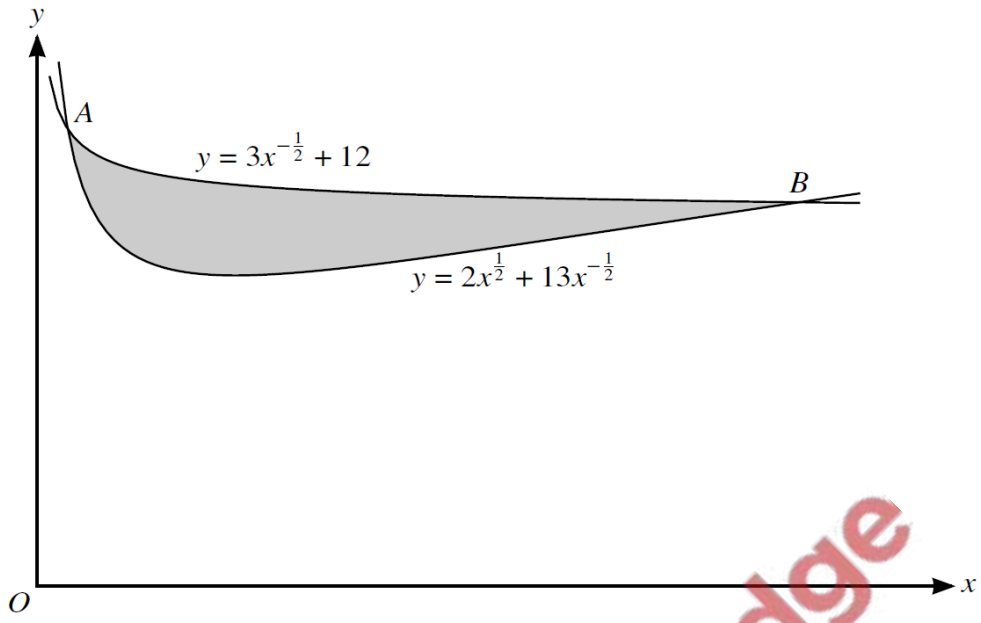
**3.** Nov/2023/Paper_9709/12/No.9




The diagram shows curves with equations $y = 2x^{\frac{1}{2}} + 13x^{-\frac{1}{2}}$ and $y = 3x^{-\frac{1}{2}} + 12$. The curves intersect at points $A$ and $B$.

**(a)** Find the coordinates of $A$ and $B$. [4]

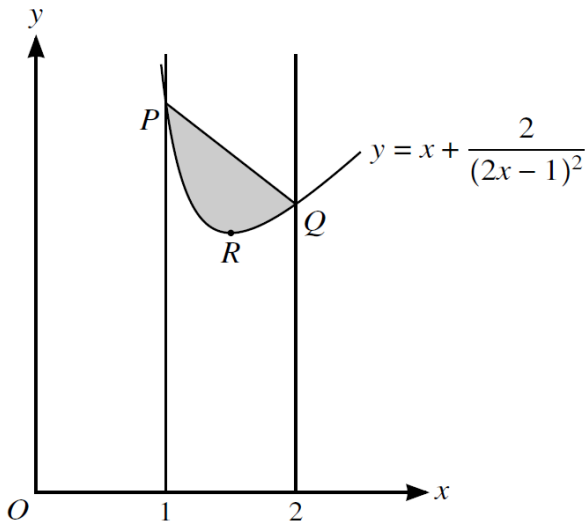
**(b)** Hence find the area of the shaded region. [5]

**4.** Nov/2023/Paper_9709/13/No.1

A curve is such that its gradient at a point $(x, y)$ is given by $\frac{dy}{dx} = x - 3x^{-\frac{1}{2}}$. It is given that the curve passes through the point $(4, 1)$.

Find the equation of the curve. [4]

**5.** Nov/2023/Paper_9709/13/No.11




The diagram shows part of the curve with equation $y = x + \frac{2}{(2x-1)^2}$. The lines $x = 1$ and $x = 2$ intersect the curve at $P$ and $Q$ respectively and $R$ is the stationary point on the curve.

**(a)** Verify that the $x$-coordinate of $R$ is $\frac{3}{2}$ and find the $y$-coordinate of $R$. [4]

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**(b)** Find the exact value of the area of the shaded region. [6]