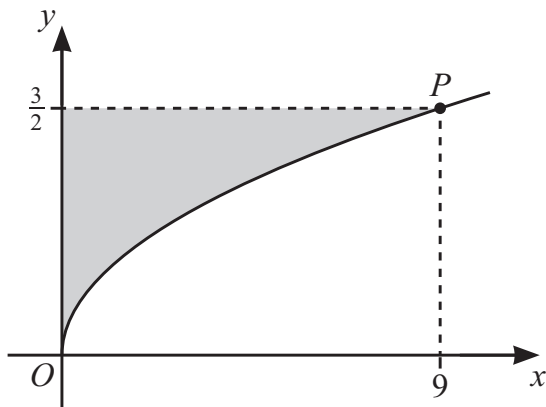




The diagram shows the curve with equation $y = \frac{1}{2}\sqrt{x}$ and the point P with coordinates $\left(9, \frac{3}{2}\right)$. The shaded region is bounded by the curve and the lines $x = 0$ and $y = \frac{3}{2}$.

- (a) Find the area of the shaded region.

[3]

Blank lined paper for writing.

(b) The shaded region is rotated through 360° about the **y-axis**.

Find the exact volume of the solid produced.

[4]

Handwriting practice sheet with 20 rows of dotted lines for tracing and writing.

11 A curve passes through the point $P(4, 3)$ and is such that

$$\frac{dy}{dx} = \frac{8}{x^2} - \frac{10}{(2x-3)^2}.$$

(a) Find the equation of the normal to the curve at P . Give your answer in the form $y = mx + c$. [3]

[illegible]

(b) Find the rate of change of the gradient of the curve when $x = 4$. [3]

[illegible]

(c) Given that the curve also passes through the point $(-1, q)$, find the value of q . [5]

Handwriting practice sheet with 20 rows of dotted lines for tracing and writing.

Additional page

If you use the following page to complete the answer to any question, the question number must be clearly shown.

[illegible]

4 The equation of a curve is such that $\frac{dy}{dx} = kx^5 + \frac{4}{x^2}$, where k is a constant. The curve passes through the point $S(2, 20)$ and the gradient of the curve at S is $\frac{65}{2}$.

[1]

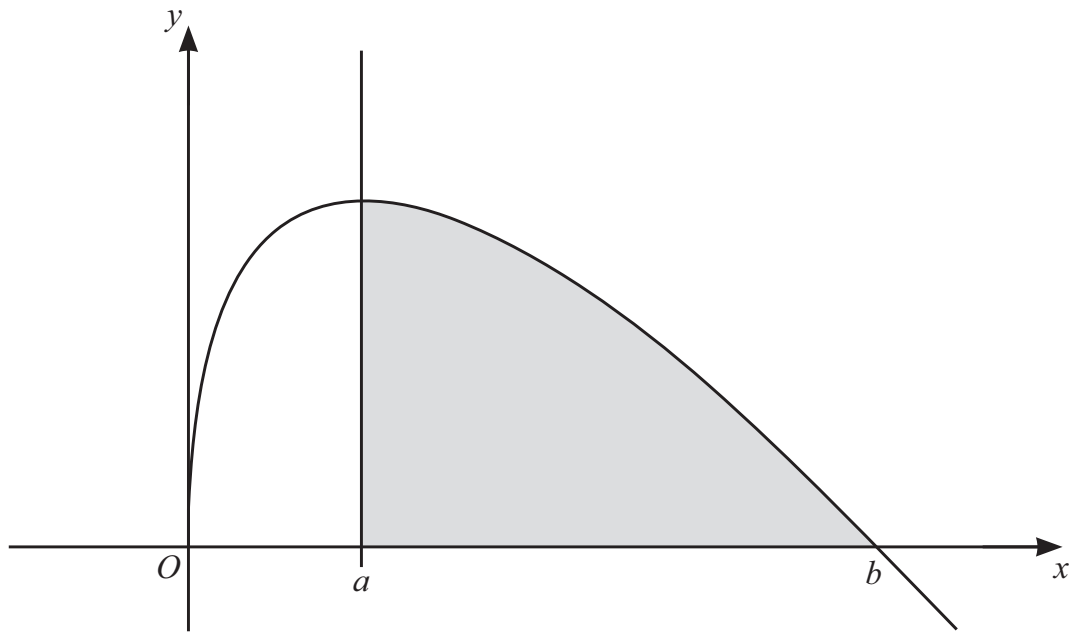
[illegible]

(b) The coordinates of a point T on the curve are $(1, t)$.

[5]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. At the bottom center, there is a small, faint circular logo or watermark. The overall appearance is that of a clean, unused piece of stationery.

5



The equation of a curve is $y = 4x^{\frac{1}{2}} - x$. The curve has a maximum point when $x = a$ and crosses the x -axis at the point with coordinates $(b, 0)$, where $b > 0$. The shaded region is bounded by the curve, the line $x = a$ and the x -axis (see diagram).

- (a)** Find the value of a .

[3]

[illegible]

(b) Find the exact area of the shaded region.

[5]

Handwriting practice lines (dotted lines) for the letter 'g'.

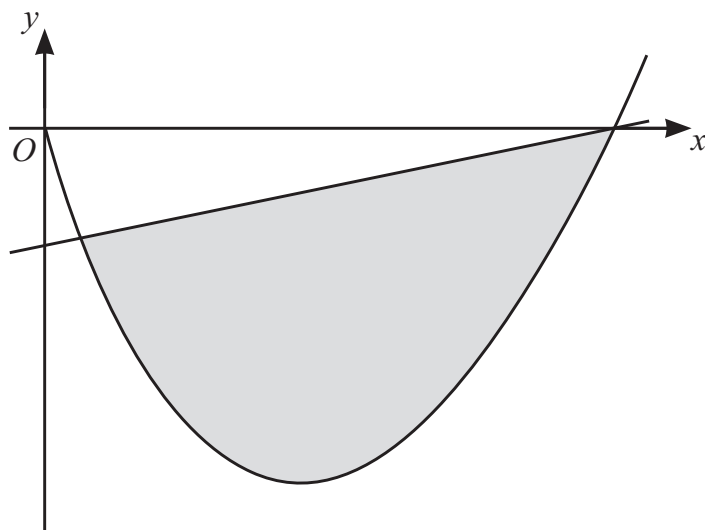
2 The equation of a curve is such that $\frac{dy}{dx} = 4(2x-5)^5 - 9x^{\frac{1}{2}}$. The curve passes through the point $A\left(4, -\frac{11}{2}\right)$.

(a) Find the gradient of the normal to the curve at the point A . [2]

[illegible]

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

[illegible]



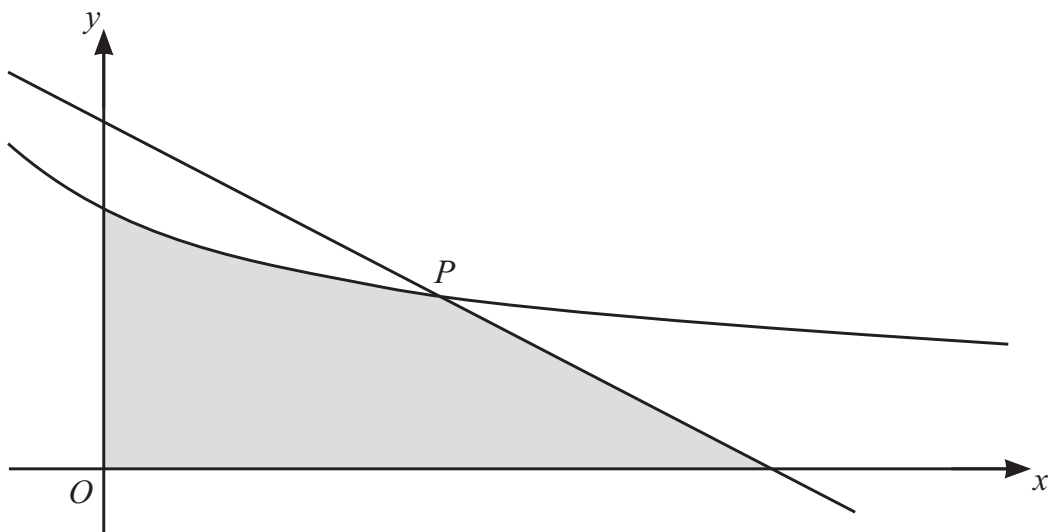
The diagram shows the curve with equation $y = 5x^{\frac{3}{2}} - 20x$ and the line with equation $y = x - 16$. The x -coordinates of the points of intersection of the curve and line are 1 and 16.

Find the area of the shaded region between the curve and the line.

[5]

[illegible]

6



The diagram shows the curve with equation $y = \frac{9}{(5x+4)^{\frac{1}{2}}}$ and the line $y = 6 - 3x$. The line and the curve intersect at the point P which has y -coordinate 3.

Find the area of the shaded region.

[6]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

A-Level Mathematics: 9709 Mathematics June 2025 Question Paper 12

- 9 The equation of a curve is such that $\frac{dy}{dx^2} = -\frac{24}{x^3}$. It is given that the curve has a stationary point at $(-2, 19)$.

- (a) Find an expression for $\frac{dy}{dx}$. [3]

[illegible]

- (b)** Find the x-coordinate of the other stationary point of the curve, and determine the nature of this stationary point. [2]

[illegible]

(c) Find the equation of the curve.

[3]

(d) Find the equation of the normal to the curve at the point where $\frac{dy}{dx} = -\frac{9}{4}$ and x is positive. Express your answer in the form $px + qy + r = 0$, where p , q and r are integers.

[4]