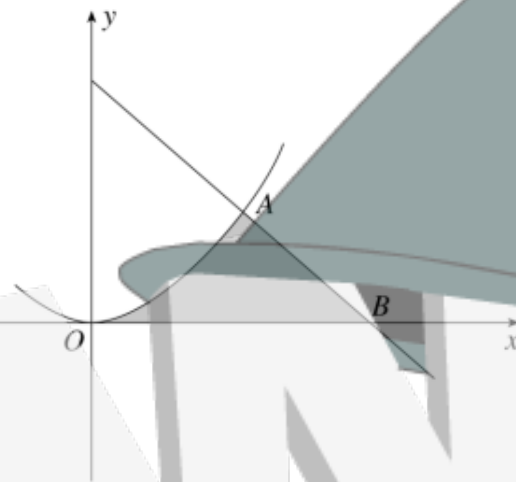


C2 Integration Questions

Specimen

6. Integrate $\sqrt{x} - \frac{2}{x^2}$ with respect to x . [4]

7.



The diagram shows the curve $y = 2x^2$ and the line $y = 12 - 2x$ intersecting at the point A . The line $y = 12 - 2x$ intersects the x -axis at B .

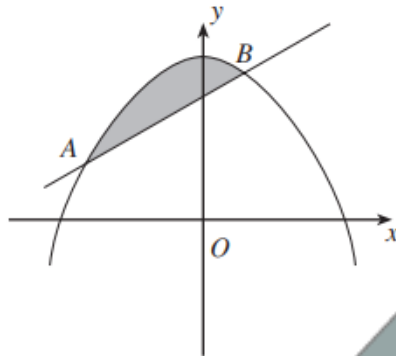
(a) Find the coordinates of A and B . [5]

(b) Evaluate the area of the shaded region [7]

2005 Winter

7. (a) Integrate $3\sqrt{x} - \frac{6}{x^3}$ with respect to x . [2]

(b)



The diagram shows a sketch of the curve $y = 16 - x^2$ and the line $y = 2x + 13$. The line and the curve intersect at the points A and B .

(i) Find the coordinates of A and B . [3]

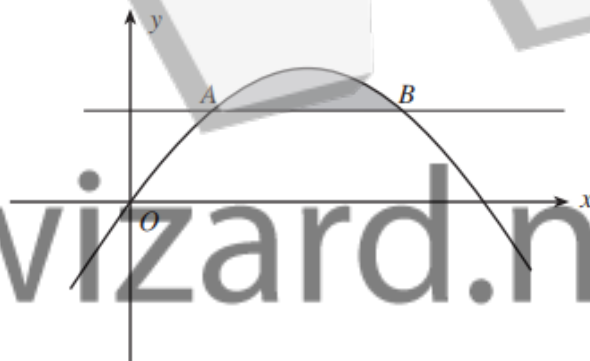
(ii) Find the area of the shaded region. [7]

2005 Summer

7. (a) Find
(b)

$$\int \left(2x^{4/3} + \frac{7}{x^{1/2}} \right) dx$$

[2]



The diagram shows a sketch of the curve $y = 6x - x^2$ and the line $y = 5$. The line and the curve intersect at the points A and B .

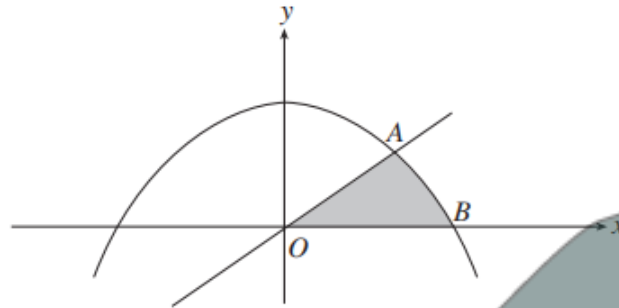
(i) Showing your working, find the coordinates of A and B .

(ii) Find the area of the shaded region. [10]

2006 Winter

6. Integrate $5x^{\frac{1}{3}} + 3x^{-3}$ with respect to x . [2]

7.



The diagram shows the curve $y = 4 - x^2$ and the line $y = 3x$ intersecting at the point A . The curve $y = 4 - x^2$ intersects the x -axis at B .

(a) Find the coordinates of A and B , showing your working. [5]

(b) Evaluate the area of the shaded region. [7]

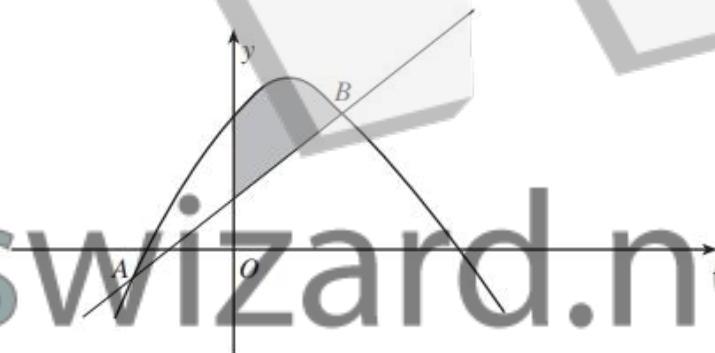
2006 Summer

6. Find

$$\int (4x^{\frac{1}{3}} - 3x^{-3} + 5) dx.$$

[3]

7.



The diagram shows the curve $y = 7 + 2x - x^2$ and the line $y = x + 1$ intersecting at the points A and B .

(a) Find the coordinates of B . [4]

(b) Evaluate the area of the shaded region. [8]

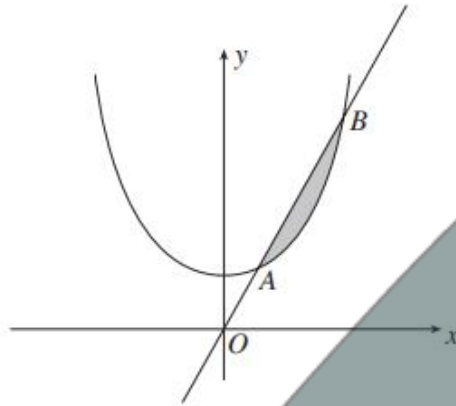
2007 Winter

7. (a) Find

$$\int \left(\sqrt{x} + \frac{2}{x^2} \right) dx.$$

[2]

(b)



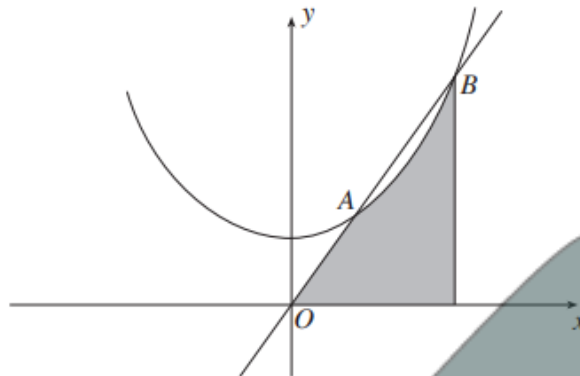
The diagram shows a sketch of the curve $y = x^2 + 3$ and the line $y = 4x$. The line and the curve intersect at the points A and B .

- (i) Showing your working, find the coordinates of A and B .
- (ii) Evaluate the area of the shaded region.

[10]

2007 Summer

6. (a) Find $\int \left(2x^{\frac{3}{2}} + \frac{9}{x^4} \right) dx$. [2]
(b)

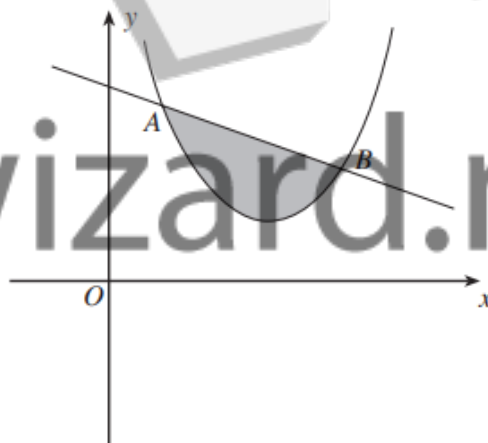


The diagram shows a sketch of the curve $y = x^2 + 2$ and the line $y = 3x$. The line and the curve intersect at the points A and B .

- (i) Find the coordinates of the points A and B . [4]
(ii) Evaluate the area of the shaded region. [7]

2008 Winter

7. (a) Find $\int \left(4x^{\frac{2}{3}} - \frac{7}{\sqrt{x}} \right) dx$. [2]
(b)



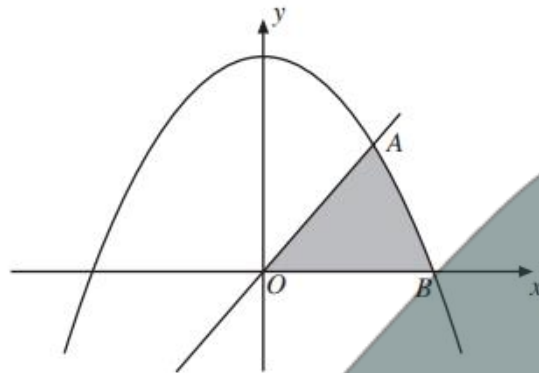
The diagram shows a sketch of the curve $y = x^2 - 6x + 11$ and the line $y = -x + 7$. The curve and the line intersect at the points A and B .

- (i) Showing your working, find the coordinates of A and B .
(ii) Find the area of the shaded region. [11]

2008 Summer

6. (a) Find $\int \left(5\sqrt{x} - \frac{4}{x^{\frac{3}{2}}} \right) dx$. [2]

(b)



The diagram shows a sketch of the curve $y = 4 - x^2$ and the line $y = 3x$. The curve and the line intersect at the point A in the first quadrant and the curve intersects the positive x -axis at the point B .

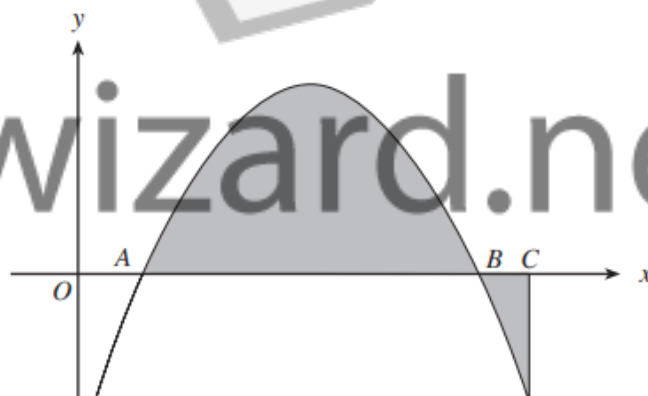
- (i) Showing your working, find the coordinates of A and the coordinates of B .
(ii) Find the area of the shaded region.

[12]

2009 Winter

6. (a) Find $\int \left(\frac{3}{x^2} - 2\sqrt{x} \right) dx$. [2]

(b)



The diagram shows a sketch of the curve $y = 5x - 4 - x^2$. The curve intersects the x -axis at the points A and B . The point C has coordinates $(5, 0)$.

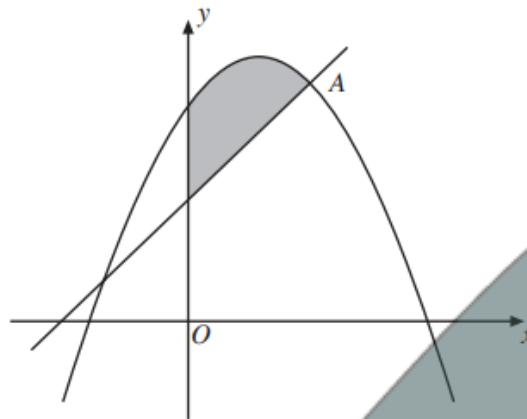
- (i) Find the x -coordinates of the points A and B . [3]
(ii) Find the **total** area of the shaded regions. [7]

2009 Summer

6. (a) Find $\int \left(\frac{5}{x^3} - 3x^{\frac{1}{4}} \right) dx$.

[2]

(b)



The diagram shows a sketch of the curve $y = 6 + 4x - x^2$ and the line $y = x + 2$. The point of intersection of the curve and the line in the first quadrant is denoted by A .

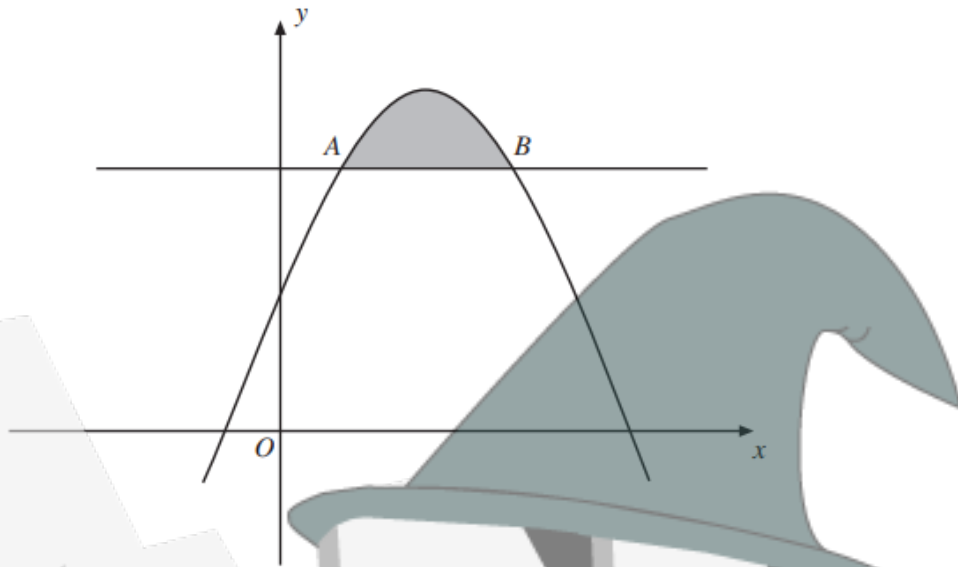
- (i) Find the coordinates of A .
- (ii) Find the area of the shaded region.

[10]

2010 Winter

6. (a) Find $\int \left(x^{\frac{1}{3}} - \frac{2}{x^{\frac{1}{4}}} \right) dx$. [2]

(b)



The diagram shows a sketch of the curve $y = 5 + 4x - x^2$, and the line $y = 8$. The curve and the line intersect at the points A and B .

- (i) Showing your working, find the x -coordinates of A and B .
(ii) Find the area of the shaded region. [10]

2010 Summer

4. Find $\int \left(3\sqrt{x} - \frac{6}{x^4} - 1 \right) dx$. [3]

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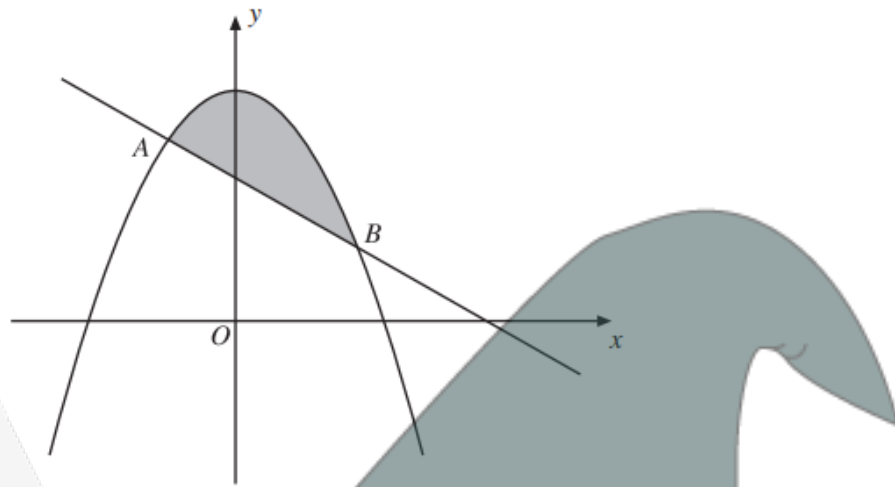
7. The region R is bounded by the curve $y = 3x + \frac{1}{5}x^3$, the x -axis and the lines $x = 1$, $x = 3$. Find the area of R . [5]

2011 Winter

6. (a) Find $\int \left(\frac{3}{\sqrt{x}} - 4x^{\frac{2}{3}} \right) dx$.

[2]

(b)



The diagram shows a sketch of the curve $y = 25 - x^2$ and the line $y = -2x + 17$. The line and the curve intersect at the points A and B .

- (i) Find the coordinates of A and B .
- (ii) Find the area of the shaded region.

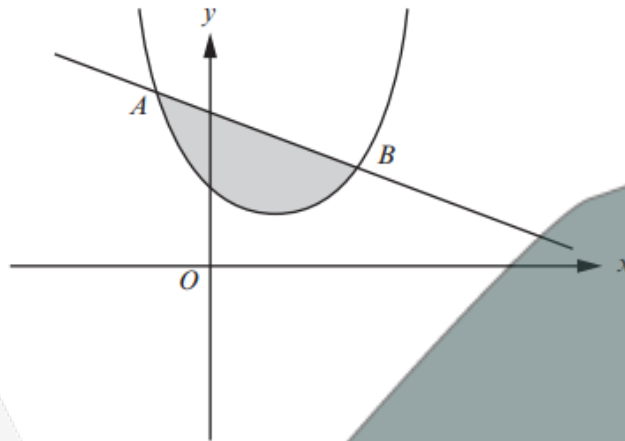
[4]

[7]

2011 Summer

6. (a) Find $\int \left(\sqrt[3]{x} - \frac{2}{x^{\frac{3}{4}}} \right) dx$. [2]

(b)



The diagram shows a sketch of the curve $y = x^2 - 4x + 6$ and the line $y = -x + 10$. The curve and the line intersect at the points A and B .

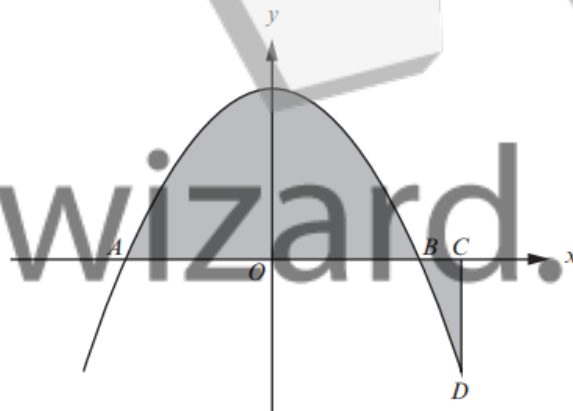
- (i) Showing your working, find the coordinates of A and B .
- (ii) Find the area of the shaded region.

[11]

2012 Winter

6. (a) Find $\int \left(\frac{4}{x^3} - 3x^{\frac{1}{4}} \right) dx$. [2]

(b)



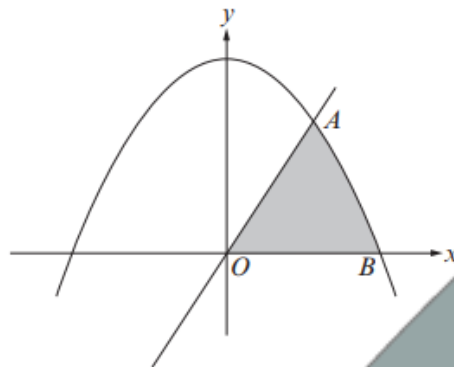
The diagram shows a sketch of the curve $y = 4 - x^2$. The curve intersects the x -axis at the points A and B . The point C has coordinates $(3, 0)$. The point D lies on the curve and CD is parallel to the y -axis.

- (i) Showing your working, find the x -coordinates of the points A and B . [2]
- (ii) Find the **total** area of the shaded regions. [6]

2012 Summer

6. (a) Find $\int \left(3\sqrt{x} - \frac{2}{x^{\frac{3}{2}}} \right) dx$. [2]

(b)



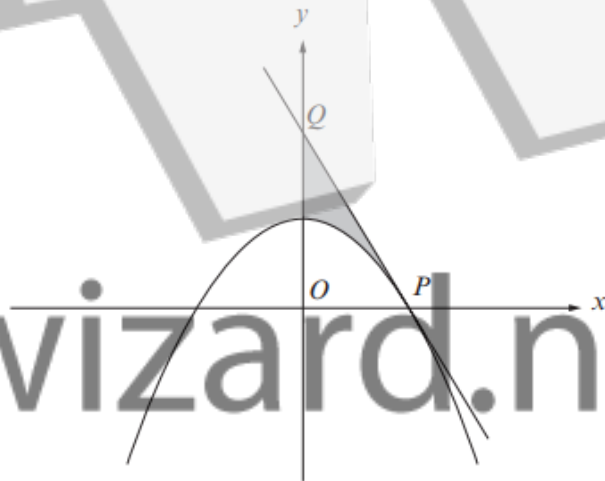
The diagram shows a sketch of the curve $y = 36 - x^2$ and the line $y = 5x$. The curve and the line intersect at the point A in the first quadrant and the curve intersects the positive x -axis at the point B .

- (i) Showing your working, find the coordinates of A and the coordinates of B .
(ii) Find the area of the shaded region. [10]

2013 Winter

6. (a) Find $\int \left(\frac{5}{x^4} - 7x^{\frac{2}{3}} \right) dx$. [2]

(b)



The diagram shows a sketch of the curve $y = 9 - x^2$ which intersects the positive x -axis at the point $P(a, 0)$.

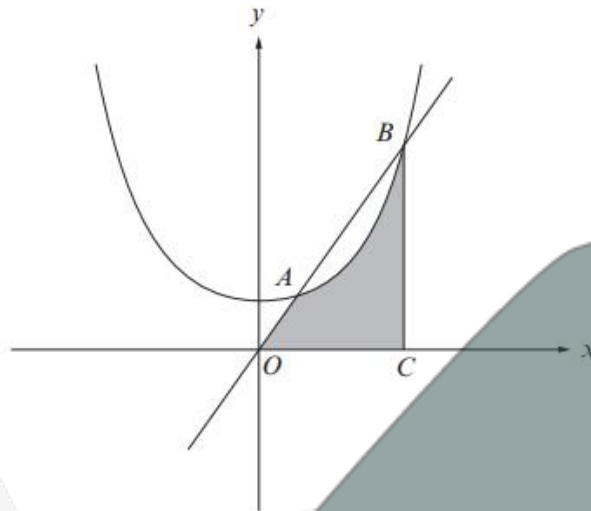
- (i) Find the value of a .
The tangent to the curve at P intersects the y -axis at the point $Q(0, b)$.
(ii) Show that $b = 18$.
(iii) Find the area of the shaded region. [10]

2013 Summer

6. (a) Find $\int \left(\sqrt[4]{x} + \frac{2}{x^5} \right) dx$.

[2]

(b)



The diagram shows a sketch of the curve $y = x^2 + 3$ and the line $y = 4x$. The curve and the line intersect at the points A and B . The line BC is parallel to the y -axis.

- (i) Showing your working, find the x -coordinates of A and B .
(ii) Find the area of the shaded region.

[9]

2014 Winter

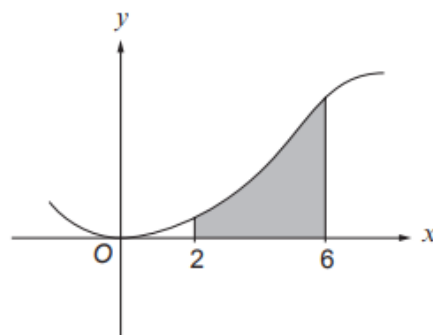
6. (a) Find $\int \left(\frac{5}{x^3} - 2x^{\frac{1}{3}} - 4 \right) dx$.

[3]

(b) The diagram below shows a sketch of the curve with equation $y = 3x^2 - \frac{1}{4}x^3$.

The shaded region is bounded by the curve, the x -axis and the lines $x = 2$, $x = 6$. Find the area of this shaded region.

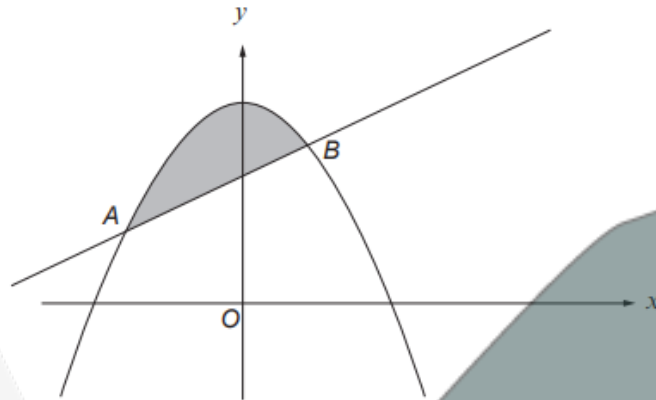
[4]



2014 Summer

6. (a) Find $\int \left(\frac{5}{x^4} - 7\sqrt{x} \right) dx$. [2]

(b)



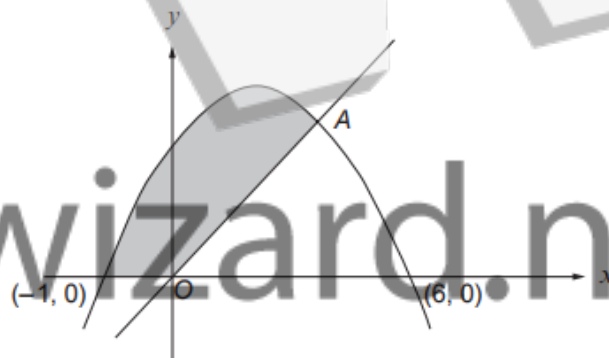
The diagram shows a sketch of the curve $y = 16 - x^2$ and the line $y = x + 10$. The line and the curve intersect at the points A and B .

- (i) Find the coordinates of A and B .
(ii) Find the area of the shaded region. [10]

2015

6. (a) Find $\int \left(\frac{3}{\sqrt{x}} - 6x^{\frac{4}{3}} \right) dx$. [2]

(b)



The diagram shows a sketch of the curve $y = 6 + 5x - x^2$ and the line $y = 4x$. The curve and the line intersect at the point A in the first quadrant and the curve intersects the x -axis at the points $(-1, 0)$ and $(6, 0)$.

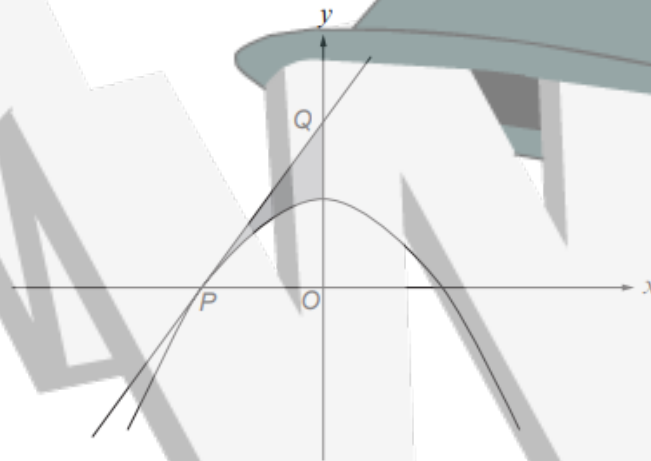
- (i) Showing your working, find the x -coordinate of A .
(ii) Find the area of the shaded region. [9]

2016

6. (a) Find $\int \left(\frac{3}{\sqrt[3]{x}} - 9x^{\frac{5}{2}} \right) dx$. [2]
- (b) The region R is bounded by the curve $y = 2x^2 + \frac{6}{x^2}$, the x -axis and the lines $x = 1$, $x = 4$. Find the area of R . [5]

2017

6. (a) Find $\int \left(\frac{2}{x^5} - 6x^{\frac{3}{4}} \right) dx$. [2]
- (b)



The diagram shows a sketch of the curve $y = 16 - x^2$ which intersects the negative x -axis at the point $P(a, 0)$.

- (i) Write down the value of a .

The tangent to the curve at P intersects the y -axis at the point $Q(0, b)$.

- (ii) Show that $b = 32$.
- (iii) Find the area of the shaded region. [10]