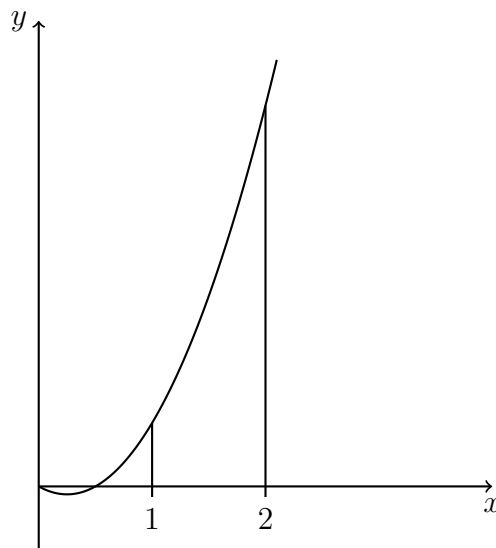


Spiral Review: 6-4+5 P1 (No Calculator) Calculus Integration

1. 18M.1.sl.TZ2.2

Let $f(x) = 6x^2 - 3x$. The graph of f is shown in the following diagram.



(a) Find $f'(x)$. [2 marks]

(b) Find the area of the region enclosed by the graph of f , the x -axis and the lines $x = 1$ and $x = 2$. [4 marks]

2. 16M.2.sl.TZ1.2

Let $f(x) = x^2$ and $g(x) = 3 \ln(x + 1)$, for $x > -1$.

(a) Solve $f(x) = g(x)$ [3 marks]

(b) Find the area of the region enclosed by the graphs of f and g . [3 marks]

3. 15N.1.sl.TZ0.3

Let $f'(x) = 6x^2 - 5$. and $f(2) = -3$, find $f(x)$. [6 marks]

4. 13N.1.sl.TZ0.4a

Consider a function $f(x)$ such that $\int_1^6 f(x) \, dx = 8$.

(a) Find $\int_1^6 2f(x) \, dx$. [2 marks]

(b) Find $\int_1^6 (f(x) + 2) \, dx$. [4 marks]

5. 16N.2.sl.TZ0.4

Let $f(x) = xe^{-x}$ and $g(x) = -3f(x) + 1$.

The graphs of f and g intersect at $x = p$ and $x = q$, where $p < q$.

(a) Find the values of f and g . [3 marks]

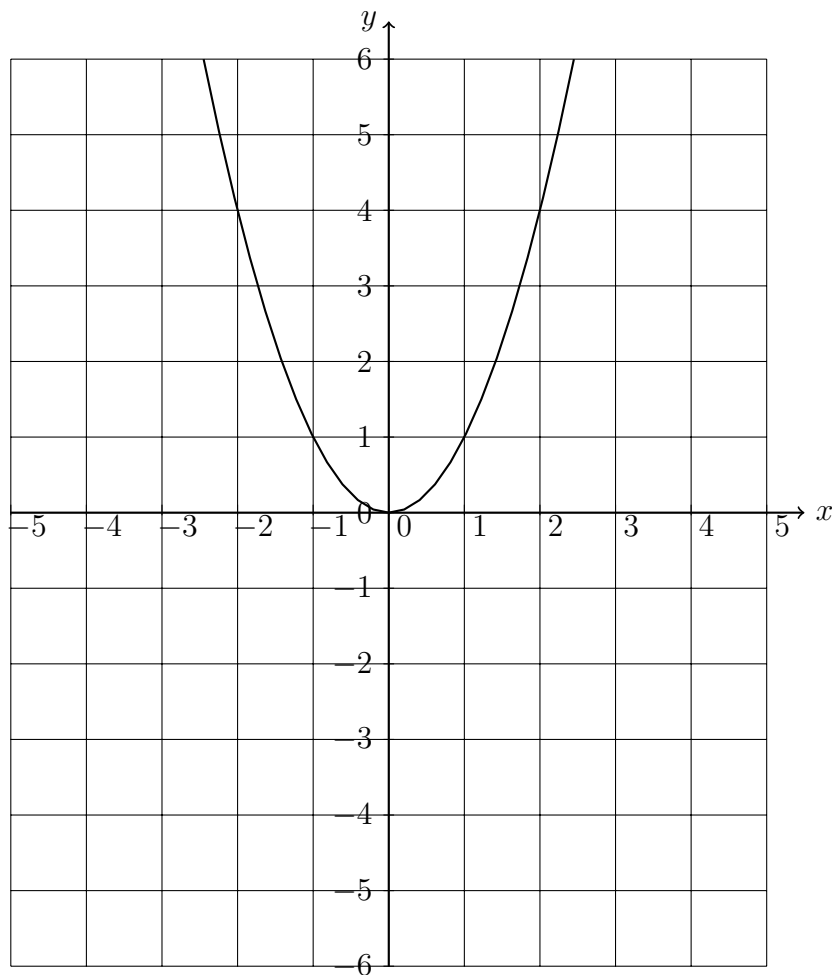
(b) Hence, find the area of the region enclosed by the graphs of f and g . [3 marks]

6. 18M.2.sl.TZ1.4

Let $g(x) = -(x - 1)^2 + 5$.

(a) Write down the coordinates of the vertex of the graph of g . [1 mark]

(b) Let $f(x) = x^2$. The following diagram shows part of the graph of f .



The graph of g intersects the graph of f at $x = -1$ and $x = 2$.

On the grid above, sketch the graph of g for $-2 \leq x \leq 4$. [3 marks]

(c) Find the area of the region enclosed by the graphs of f and g . [3 marks]

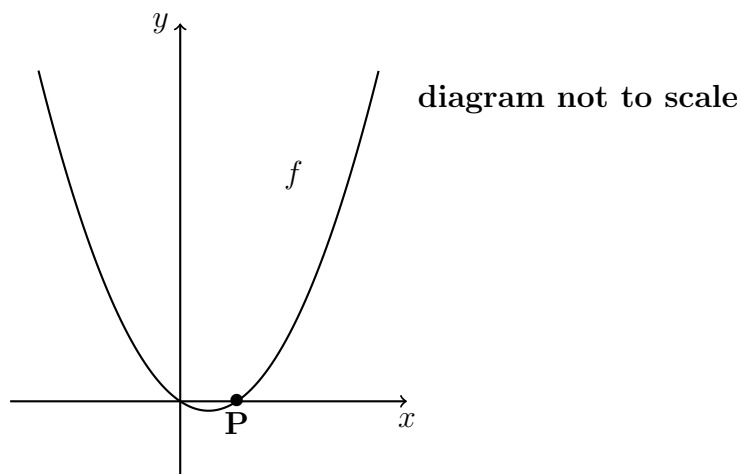
7. 14M.1.sl.TZ2.5

The graph of a function h passes through the point $(\frac{\pi}{12}, 5)$.

Given that $h'(x) = 4 \cos 2x$, find $h(x)$. [6 marks]

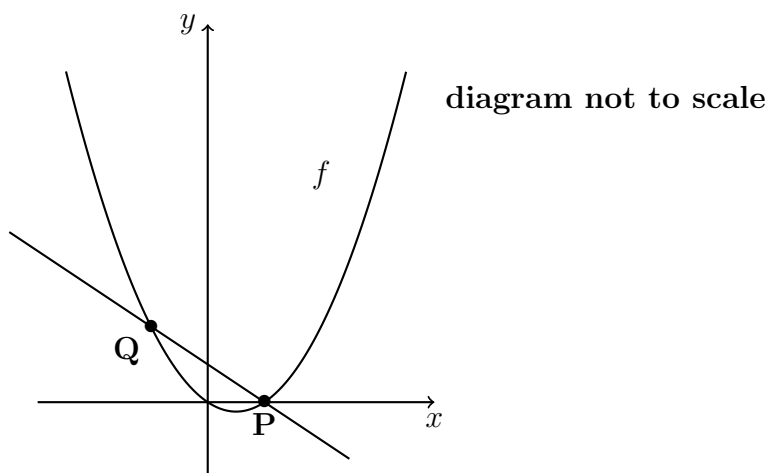
8. (#19) 17N.1.sl.TZ0.8

Let $f(x) = x^2 - x$, for $x \in \mathbb{R}$. The following diagram shows part of the graph of f .



The graph of f crosses the x -axis at the origin and at the point $P(1, 0)$.

- (a) Show that $f'(1) = 1$. [3 marks]
- (b) The line L is the normal to the graph of f at P .
Find the equation of L in the form $y = ax + b$. [3 marks]
- (c) The line L intersects the graph of f at another point Q , as shown in the following diagram.

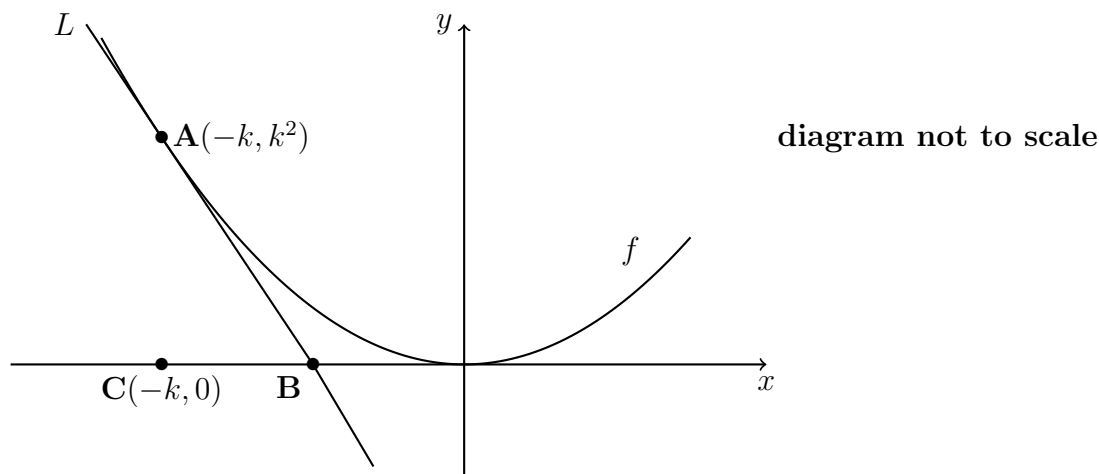


Find the x -coordinate of Q . [4 marks]

- (d) Find the area of the region enclosed by the graph of f and the line L . [6 marks]

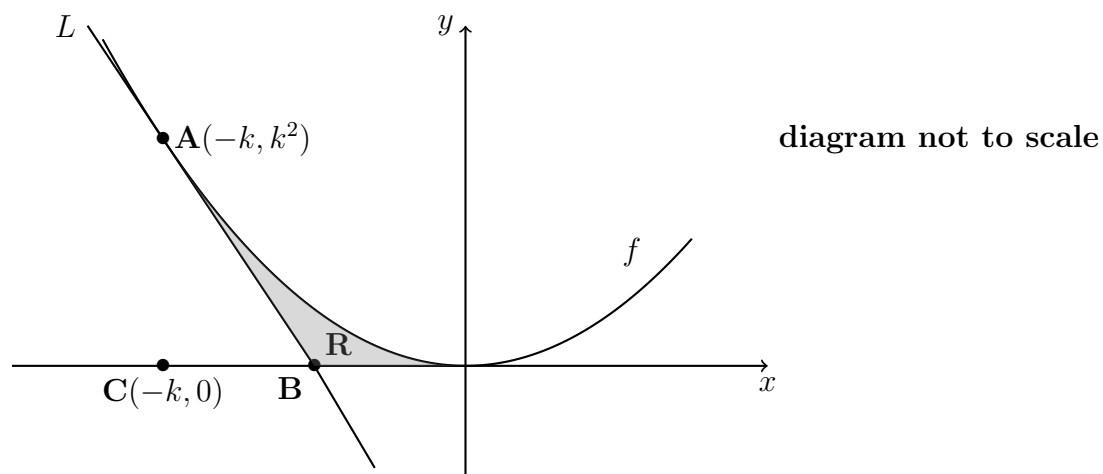
9. (#23) 17M.1.sl.TZ2.10

Let $f(x) = x^2$. The following diagram shows part of the graph of f .



The line L is the tangent to the graph of f at the point $A(-k, k^2)$, and intersects the x -axis at point B . The point C is $(-k, 0)$.

- Write down $f'(x)$. [1 mark]
- Find the gradient of L . [2 marks]
- Show that the x -coordinate of B is $-\frac{k}{2}$. [5 marks]
- Find the area of triangle ABC , giving your answer in terms of k . [2 marks]
- The region R is enclosed by L , the graph of f , and the x -axis. This is shown in the following diagram.



Given that the area of triangle ABC is p times the area of R , find the value of p .
[7 marks]