

1.) ***GDC not permitted***

(a) Find $\int \frac{1}{2x+3} dx$.

(2)

(b) Given that $\int_0^3 \frac{1}{2x+3} dx = \ln \sqrt{P}$, find the value of P .

(4)

(Total 6 marks)

2.)

Given that $\int_1^3 g(x) dx = 10$, deduce the value of

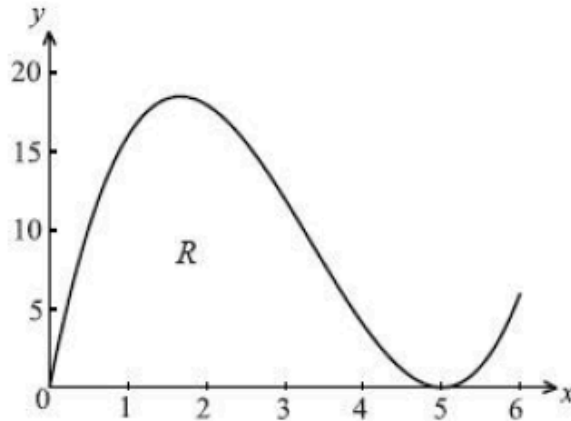
GDC not permitted

(a) $\int_1^3 \frac{1}{2} g(x) dx$;

(b) $\int_1^3 (g(x) + 4) dx$.

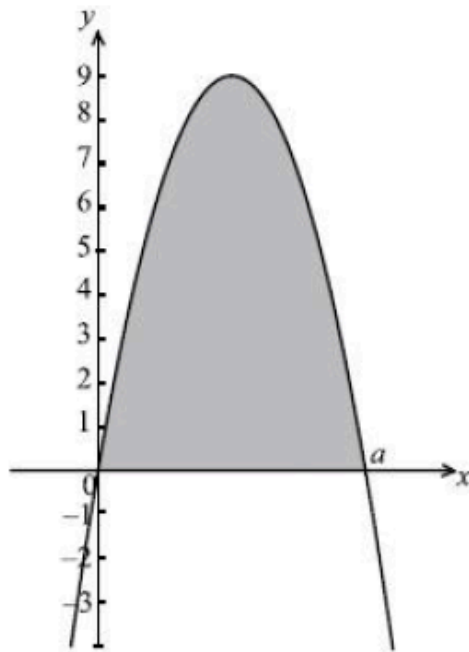
5.) ***GDC permitted***

Let $f(x) = x(x - 5)^2$, for $0 \leq x \leq 6$. The following diagram shows the graph of f .



Let R be the region enclosed by the x -axis and the curve of f .

- (a) Find the area of R . (3)
- (b) Find the volume of the solid formed when R is rotated through 360° about the x -axis. (4)
- (c) The diagram below shows a part of the graph of a quadratic function $g(x) = x(a - x)$. The graph of g crosses the x -axis when $x = a$.

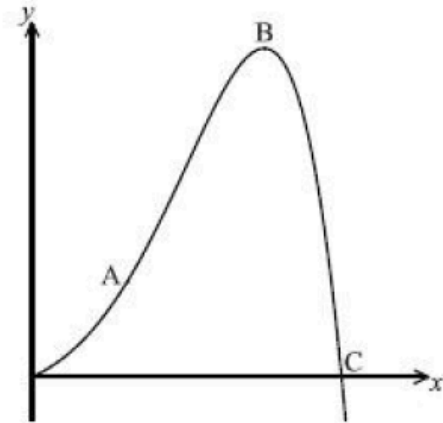


The area of the shaded region is equal to the area of R . Find the value of a .

(7)
(Total 14 marks)

6.) ***GDC Permitted***

38.) The function f is defined as $f(x) = e^x \sin x$, where x is in radians. Part of the curve of f is shown below.



There is a point of inflexion at A, and a local maximum point at B. The curve of f intersects the x -axis at the point C.

- (a) Write down the x -coordinate of the point C. (1)

- (b)
 - (i) Find $f'(x)$.
 - (ii) Write down the value of $f'(x)$ at the point B. (4)

- (c) Show that $f''(x) = 2e^x \cos x$. (2)

- (d)
 - (i) Write down the value of $f''(x)$ at A, the point of inflexion.
 - (ii) Hence, calculate the coordinates of A. (4)

- (e) Let R be the region enclosed by the curve and the x -axis, between the origin and C.
 - (i) Write down an expression for the area of R .
 - (ii) Find the area of R . (4)

(Total 15 marks)

NAME: _____ **Paper Preview: Integrals** **DATE: 02/22/2018**

Answer key: show all calculations for full marks