

1. The first three terms of a geometric series are

18, 12 and p

respectively, where p is a constant.

Find

(a) the value of the common ratio of the series, (1)

(b) the value of p , (1)

(c) the sum of the first 15 terms of the series, giving your answer to 3 decimal places. (2)

Horizontal lines for writing answers.



Question 3 continued

Lined area for writing the answer to Question 3.

(Total 9 marks)

Q3



P 4 1 8 5 9 A 0 9 3 2

4.
$$y = \frac{5}{(x^2 + 1)}$$

(a) Complete the table below, giving the missing value of y to 3 decimal places.

x	0	0.5	1	1.5	2	2.5	3
y	5	4	2.5		1	0.690	0.5

(1)

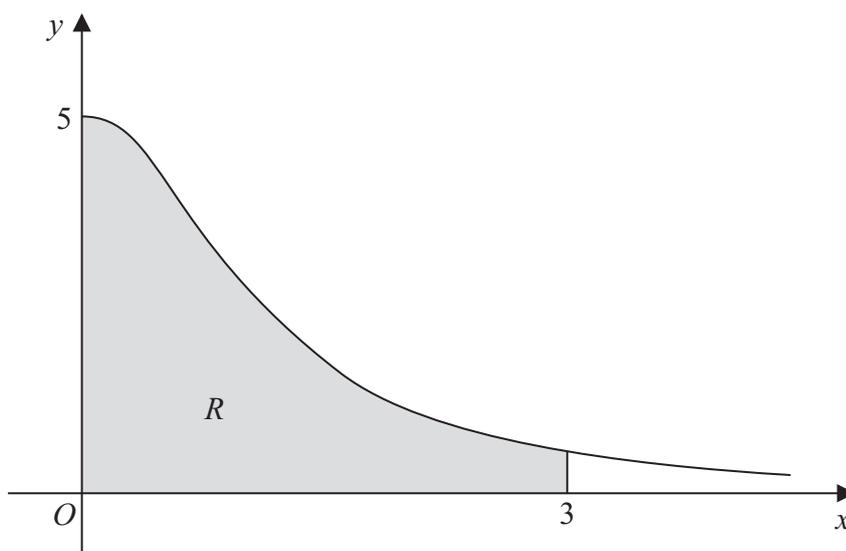


Figure 1

Figure 1 shows the region R which is bounded by the curve with equation $y = \frac{5}{(x^2 + 1)}$, the x -axis and the lines $x = 0$ and $x = 3$

(b) Use the trapezium rule, with all the values of y from your table, to find an approximate value for the area of R .

(4)

(c) Use your answer to part (b) to find an approximate value for

$$\int_0^3 \left(4 + \frac{5}{(x^2 + 1)} \right) dx$$

giving your answer to 2 decimal places.

(2)



Question 5 continued

Lined writing area consisting of 30 horizontal lines.

(Total 9 marks)

Q5



6.

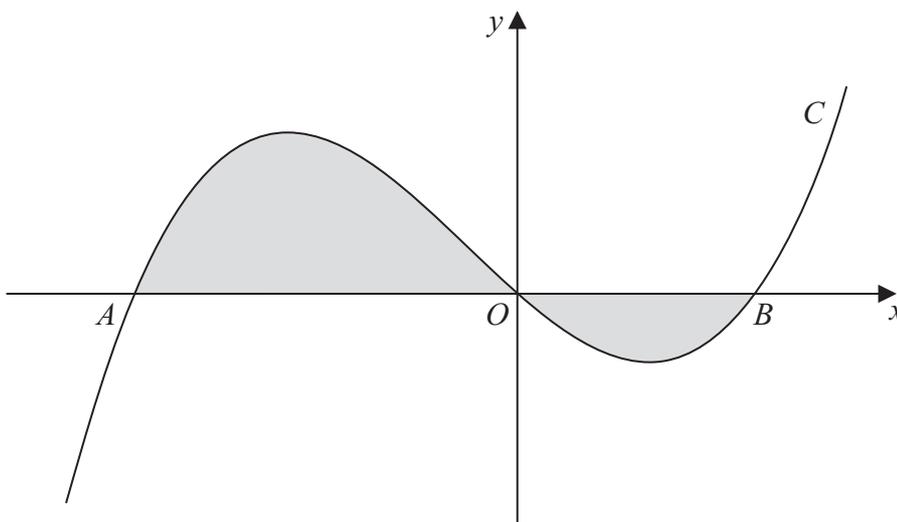


Figure 3

Figure 3 shows a sketch of part of the curve C with equation

$$y = x(x + 4)(x - 2)$$

The curve C crosses the x -axis at the origin O and at the points A and B .

- (a) Write down the x -coordinates of the points A and B . **(1)**

The finite region, shown shaded in Figure 3, is bounded by the curve C and the x -axis.

- (b) Use integration to find the total area of the finite region shown shaded in Figure 3. **(7)**



8. (i) Solve, for $-180^\circ \leq x < 180^\circ$,

$$\tan(x - 40^\circ) = 1.5$$

giving your answers to 1 decimal place.

(3)

(ii) (a) Show that the equation

$$\sin \theta \tan \theta = 3 \cos \theta + 2$$

can be written in the form

$$4 \cos^2 \theta + 2 \cos \theta - 1 = 0$$

(3)

(b) Hence solve, for $0 \leq \theta < 360^\circ$,

$$\sin \theta \tan \theta = 3 \cos \theta + 2$$

showing each stage of your working.

(5)



10.

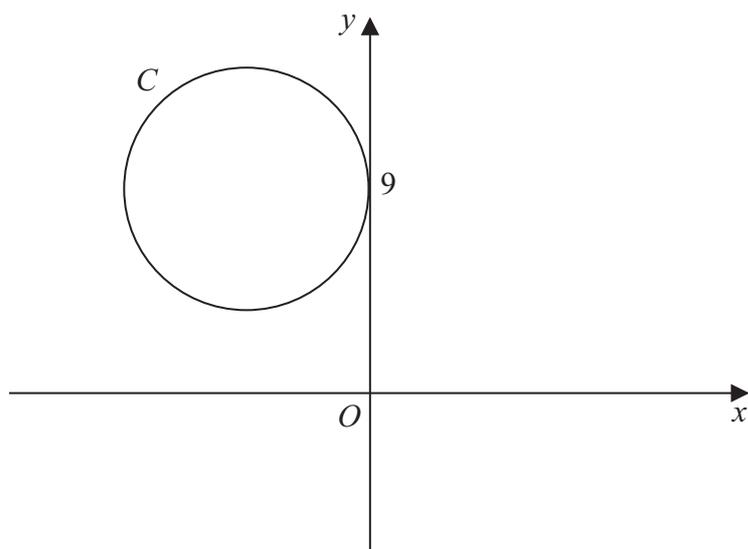


Figure 4

The circle C has radius 5 and touches the y -axis at the point $(0, 9)$, as shown in Figure 4.

(a) Write down an equation for the circle C , that is shown in Figure 4. (3)

A line through the point $P(8, -7)$ is a tangent to the circle C at the point T .

(b) Find the length of PT . (3)



