

GCSE Grade 8/9

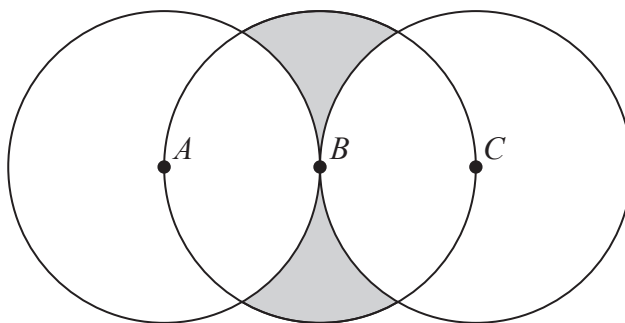
Maths
Booklet 3

Paper 1H
Non-Calculator

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- 1 The diagram shows three circles, each of radius 4 cm.

The centres of the circles are A , B and C such that ABC is a straight line and $AB = BC = 4$ cm.



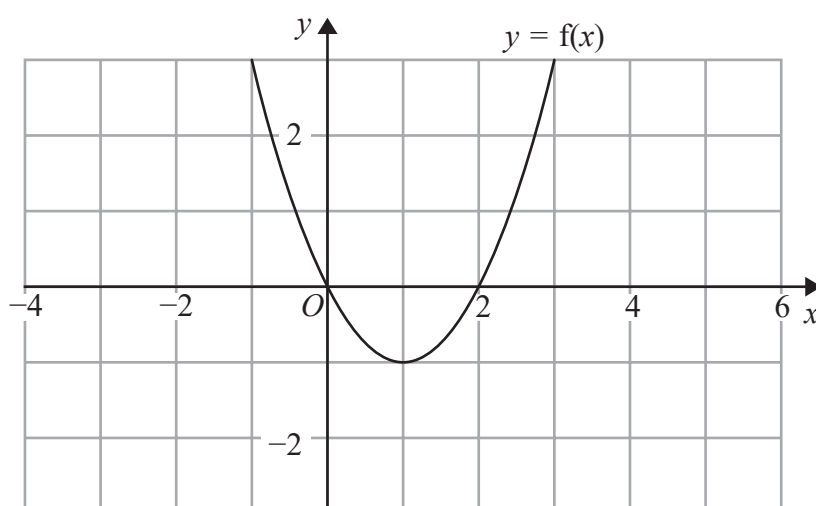
Work out the total area of the two shaded regions.
Give your answer in terms of π

..... cm²

(Total for Question 1 is 5 marks)

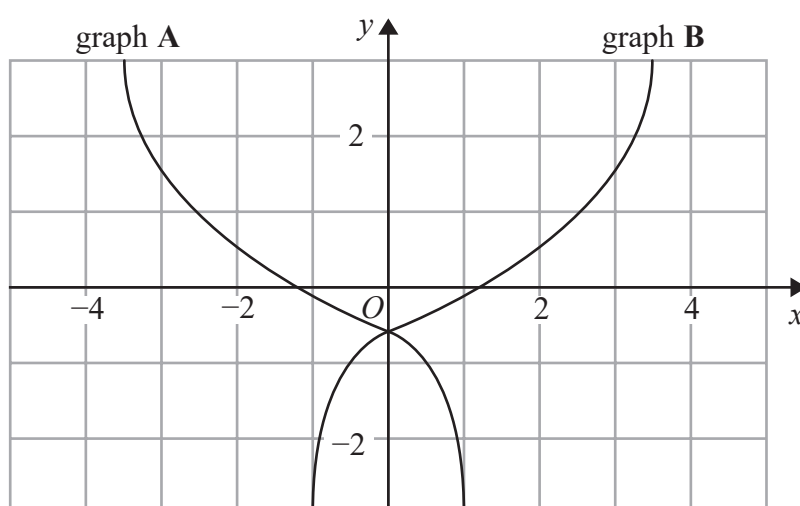


2 The graph of $y = f(x)$ is shown on the grid below.



(a) On the grid above, sketch the graph of $y = f(x - 2)$

(1)



On the grid, graph A has been reflected to give graph B.

The equation of graph A is $y = g(x)$

(b) Write down the equation of graph B.

(1)

(Total for Question 2 is 2 marks)



3 For all values of x

$$f(x) = (x + 1)^2 \quad \text{and} \quad g(x) = 2(x - 1)$$

(a) Show that $gf(x) = 2x(x + 2)$

(2)

(b) Find $g^{-1}(7)$

(2)

(Total for Question 3 is 4 marks)

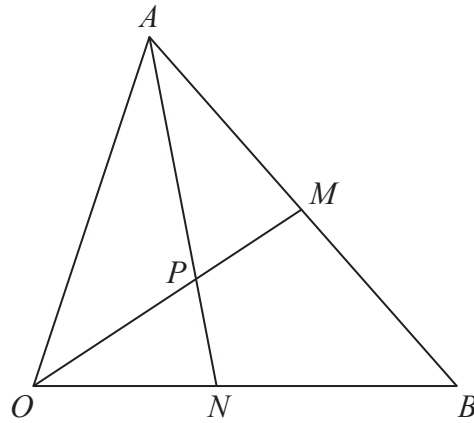


- 4 Show that $\frac{(\sqrt{18} + \sqrt{2})^2}{\sqrt{8} - 2}$ can be written in the form $a(b + \sqrt{2})$ where a and b are integers.

(Total for Question 4 is 3 marks)



5



OAB is a triangle.
 OPM and APN are straight lines.
 M is the midpoint of AB .

$$\vec{OA} = \mathbf{a} \quad \vec{OB} = \mathbf{b}$$

$$OP:PM = 3:2$$

Work out the ratio $ON:NB$

(Total for Question 5 is 5 marks)



P 5 5 5 8 4 A 0 1 9 2 0

- 6 There are only green pens and blue pens in a box.

There are three more blue pens than green pens in the box.

There are more than 12 pens in the box.

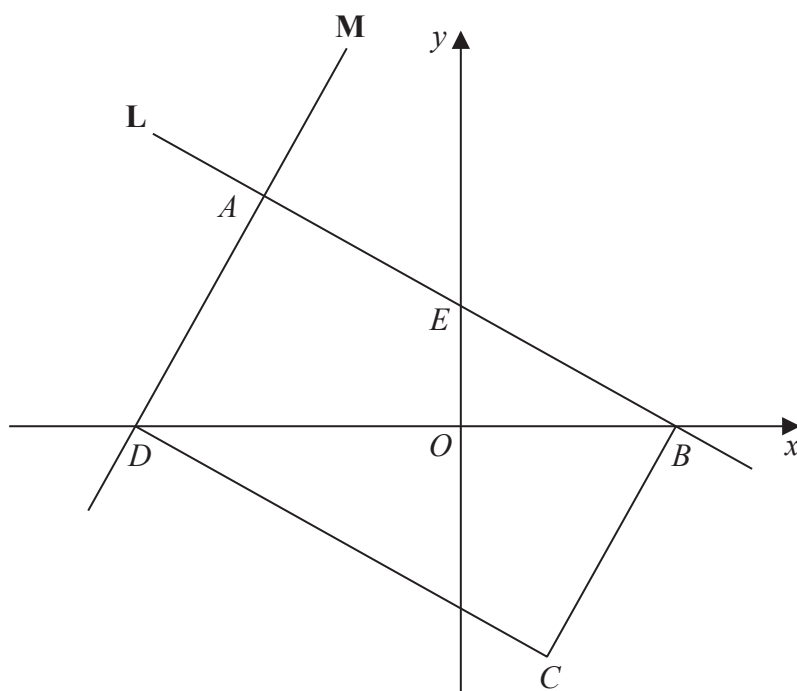
Simon is going to take at random two pens from the box.

The probability that Simon will take two pens of the same colour is $\frac{27}{55}$

Work out the number of green pens in the box.

(Total for Question 6 is 6 marks)





$ABCD$ is a rectangle.

A , E and B are points on the straight line L with equation $x + 2y = 12$

A and D are points on the straight line M .

$$AE = EB$$

Find an equation for M .

(Total for Question 7 is 4 marks)



- 8 The table shows some values of x and y that satisfy the equation $y = a \cos x^\circ + b$

| | | | | | | | |
|-----|---|----------------|----|----|-----|----------------|-----|
| x | 0 | 30 | 60 | 90 | 120 | 150 | 180 |
| y | 3 | $1 + \sqrt{3}$ | 2 | 1 | 0 | $1 - \sqrt{3}$ | -1 |

Find the value of y when $x = 45$

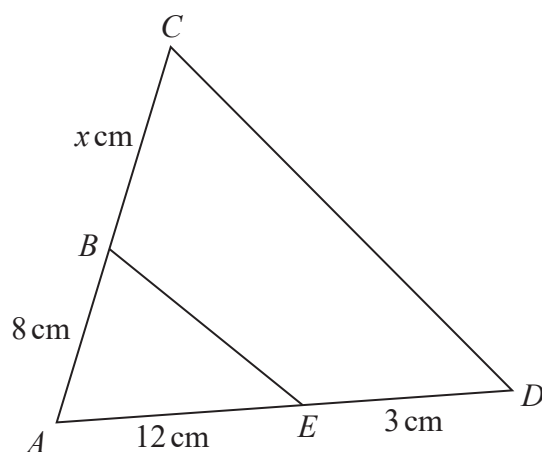
(Total for Question 8 is 4 marks)

- 9 Show that $\frac{6 - \sqrt{8}}{\sqrt{2} - 1}$ can be written in the form $a + b\sqrt{2}$ where a and b are integers.

(Total for Question 9 is 3 marks)



10 The two triangles in the diagram are similar.



There are two possible values of x .

Work out each of these values.

State any assumptions you make in your working.

(Total for Question 10 is 5 marks)

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