

# Gold Level

## Question Paper 16

Level	IGCSE
Subject	Maths
Exam Board	Edexcel
Difficulty Level	Gold
Booklet	Question Paper 16

**Time Allowed:** 59 minutes

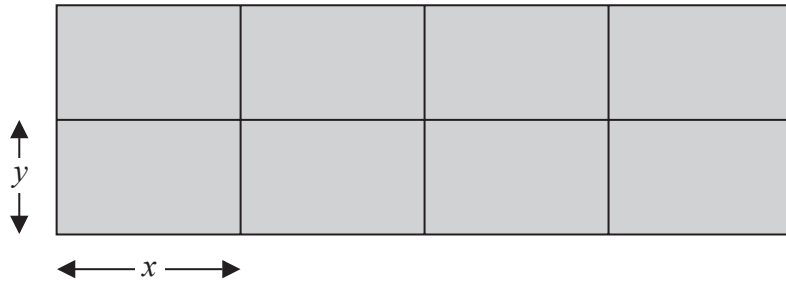
**Score:** /49

**Percentage:** /100

Grade Boundaries:

9	8	7	6	5	4	3	2	1
>85%	75%	65%	55%	45%	35%	25%	15%	<15%

- 1 A farmer has 180 metres of fencing.  
With the 180 metres of fencing, he makes an enclosure divided into eight equal, rectangular pens.  
The fencing is used for the perimeter of each pen.



The length of each pen is  $x$  metres and the width of each pen is  $y$  metres.

- (a) (i) Show that  $y = 18 - 1.2x$

The total area of the enclosure is  $A \text{ m}^2$ .

- (ii) Show that  $A = 144x - 9.6x^2$

(3)

- (b) Find  $\frac{dA}{dx}$

.....  
(2)

- (c) Find the maximum value of  $A$ .

$A = \dots\dots\dots$   
(3)

(Total for Question 1 is 8 marks)

2 The diagram shows two regular hexagons,  $OABCDE$  and  $FGHIJ$ .

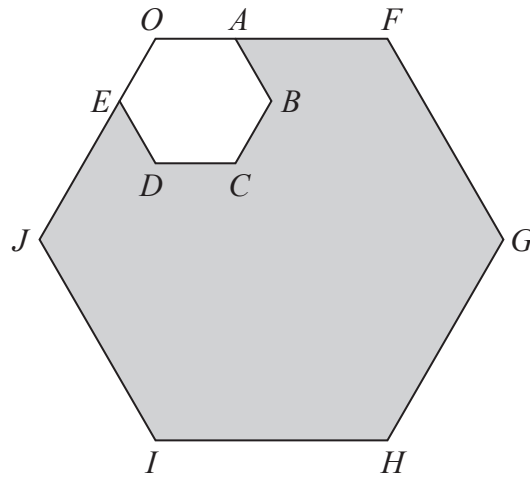


Diagram **NOT** accurately drawn

$OAF$  and  $OEJ$  are straight lines.  
 $OF = 3 OA$ .  
The area of  $OABCDE$  is  $4 \text{ cm}^2$ .

Calculate the area of the shaded region.

.....  $\text{cm}^2$

**(Total for Question 2 is 3 marks)**

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3 Make  $x$  the subject of  $y = \sqrt{\frac{2x + 1}{x - 1}}$

.....  
**(Total for Question 3 is 4 marks)**

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4 A trapezium  $ABCD$  has an area of  $5\sqrt{6}$   $\text{cm}^2$ .

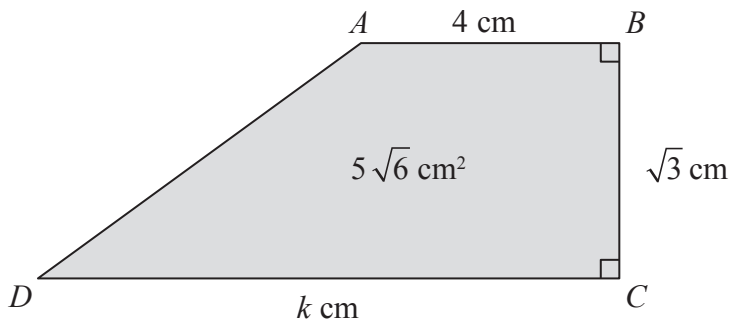


Diagram **NOT** accurately drawn

- $AB = 4 \text{ cm}$ .
- $BC = \sqrt{3} \text{ cm}$ .
- $DC = k \text{ cm}$ .

Calculate the value of  $k$ , giving your answer in the form  $a\sqrt{b} - c$  where  $a$ ,  $b$  and  $c$  are positive integers.  
Show each step in your working.

$k = \dots\dots\dots$

**(Total for Question 4 is 3 marks)**

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5 Rachael walks to school.

The distance to school is 2.8 km, correct to the nearest 0.1 km.

She walks at a speed of 5 km/h, correct to the nearest km/h.

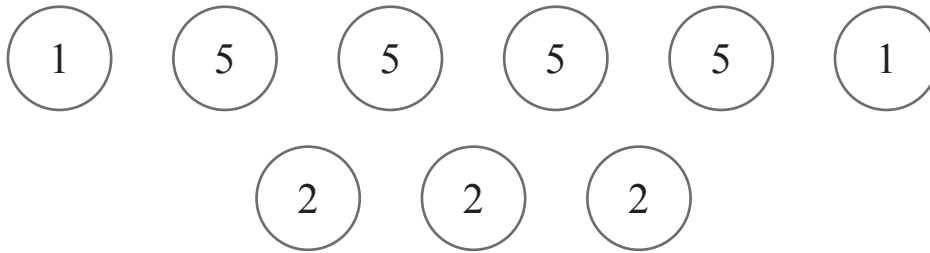
Calculate the upper bound, in minutes, for the time Rachael takes to walk to school.

..... minutes

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**(Total for Question 5 is 3 marks)**

- 6 Here are nine counters.  
Each counter has a number on it.



The counters are turned over to hide their numbers and are then mixed up.

Susan takes at random a counter and turns it over to reveal its number.

She takes at random a second counter, from the remaining eight counters, and turns it over to reveal its number.

- (a) Calculate the probability that the number 5 is on both of the two counters Susan takes.

.....  
(2)

- (b) Calculate the probability that the sum of the numbers on the two counters Susan takes is divisible by 3

.....  
(3)

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(Total for Question 6 is 5 marks)

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7 The function  $f$  is defined as  $f(x) = \frac{3}{4+x}$

(a) Find the value of  $f(1)$

.....  
(1)

(b) State which value of  $x$  must be excluded from any domain of  $f$ .

.....  
(1)

The function  $g$  is defined as  $g(x) = 5 + x$

(c) Given that  $g(a) = 7$ , find the value of  $a$ .

$a =$  .....  
(1)

(d) Calculate  $fg(1)$

.....  
(2)

(e) Find  $fg(x)$   
Simplify your answer.

$fg(x) =$  .....  
(2)

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**(Total for Question 7 is 7 marks)**



8 The diagram shows a metal plate.

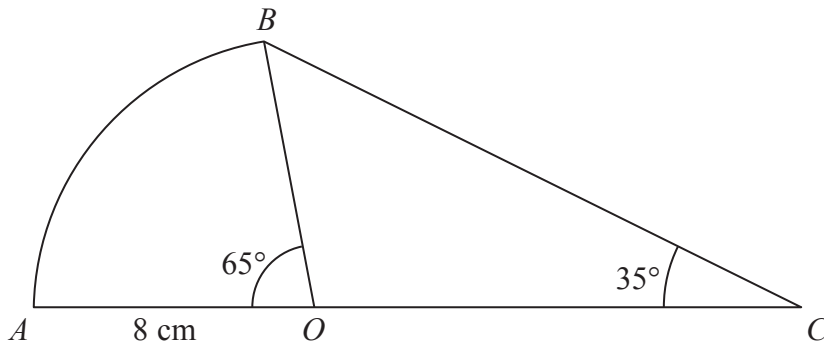


Diagram **NOT** accurately drawn

The metal plate is made from a sector  $OAB$  of a circle, centre  $O$ , and a triangle  $OCB$ .

Angle  $AOB = 65^\circ$  Angle  $OCB = 35^\circ$

$OA = OB = 8$  cm.

$AOC$  is a straight line.

- (a) Calculate the length of  $BC$ .  
Give your answer correct to 3 significant figures.

..... cm  
(3)

- (b) Calculate the total area of the metal plate.  
Give your answer correct to 3 significant figures.

..... cm<sup>2</sup>  
(4)

(Total for Question 8 is 7 marks)

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9 Solve the equation  $\frac{3}{(x+2)} + \frac{4}{(x-3)} = 2$

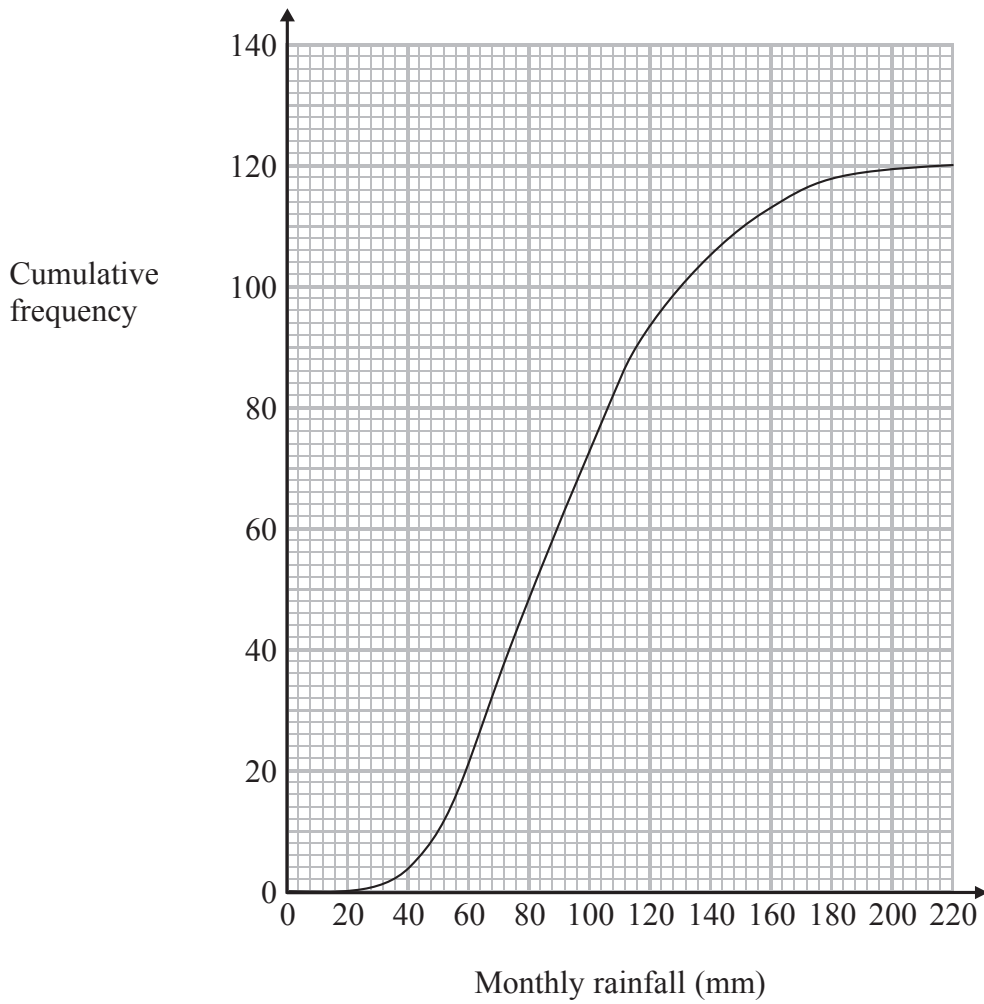
Show clear algebraic working.

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(Total for Question 9 is 5 marks)

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10 The cumulative frequency graph gives information about the monthly rainfall, in millimetres, in the United Kingdom during 120 months in the years 2001 to 2010.



(a) Use the graph to estimate the number of months for which rainfall was less than 50 mm.

.....  
(1)

(b) Use the graph to find an estimate for the median monthly rainfall.

..... mm  
(1)

(c) Use the graph to find an estimate for the interquartile range of the monthly rainfall.

..... mm  
(2)

(Total for Question 10 is 4 marks)