Gold Level

Model Answers 3

Level	IGCSE
Subject	Maths
Exam Board	Edexcel
Difficulty Level	Gold
Booklet	Model Answers 3

Time Allowed:　　　　**60 minutes**

Score:　　　　**/ 50**

Percentage:　　　　**/100**

1
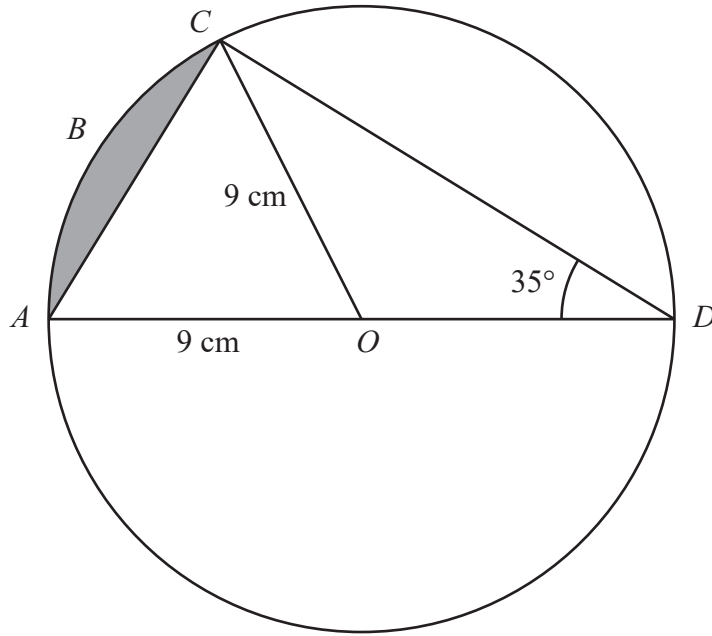

Diagram **NOT** accurately drawn

AOD is a diameter of a circle, with centre *O* and radius 9 cm.
ABC is an arc of the circle.
AC is a chord.
Angle *ADC* = 35°

Calculate the area of the shaded segment.
Give your answer correct to 3 significant figures.

AOC = 2 x 35 = 70

Area of the triangle AOC = 0.5 a b sin(c) = 0.5 x9 x 9 x sin(70) = 38.05...

Area of sector = θ/360 x π x r^2
= (70/360)xπx9x9 = 49.48...

Area of sector - area of the triangle = shaded area = 49.48... - 39.05 = 11.4

11.4
.... cm^2

(Total for Question is 6 marks)

2 Show that $\dfrac{\sqrt{3}+\sqrt{27}}{\sqrt{2}}$ can be expressed in the form $\sqrt{k}$ where k is an integer.

State the value of k.

Multiply top and bottom by $\sqrt{2}$

$$\frac{\left(\sqrt{3}+\sqrt{27}\right)}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}\left(\sqrt{3}+\sqrt{27}\right)}{2}$$

$$\frac{\left(\sqrt{2}\right)\left(\sqrt{3}\right)+\left(\sqrt{9\times3}\times\sqrt{2}\right)}{2} = \frac{\sqrt{6}+3\sqrt{6}}{2}$$

$$\frac{4\sqrt{6}}{2} = 2\sqrt{6} = \sqrt{4\times6} = \sqrt{24}$$

$k =$ **24**

(Total for Question is 3 marks)

3 Simplify fully $\dfrac{4}{x}+\dfrac{3}{2-x}$

Multiply top and bottom of first fraction by 2-x and second by x to ensure they have a common denominator.

$$\frac{2-x}{2-x}\left(\frac{4}{x}\right) + \frac{x}{x}\left(\frac{3}{2-x}\right)$$

$$\frac{4(2-x)}{x(2-x)} + \frac{3x}{x(2-x)}$$

$$\frac{8-4x}{x(2-x)} + \frac{3x}{x(2-x)}$$

$$\frac{(8-4x)+(3x)}{x(2-x)}$$

$$\frac{8-x}{x(2-x)}$$
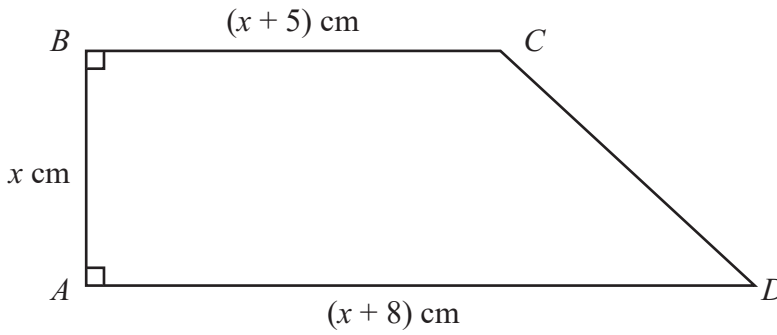
$$\frac{8-x}{x(2-x)}$$

(Total for Question is 3 marks)

4

(x + 5) cm

B

C

Diagram **NOT**
accurately drawn

x cm

A

(x + 8) cm

D

The diagram shows a trapezium *ABCD* with *AD* parallel to *BC*.
AB = *x* cm, *BC* = (*x* + 5) cm and *AD* = (*x* + 8) cm.
The area of the trapezium is 42 cm².

(a) Show that $2x^2 + 13x - 84 = 0$

Area of a trapezium is 0.5(a+b)h

Area =0.5 ((x+5) + (x+8))(x) =42
0.5(2x + 13) x = 42
(2x +13)x = 84

$2x^2$ + 13x -84 = 0
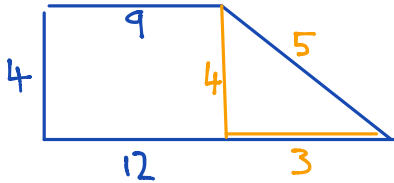
(2)

(b) Calculate the perimeter of the trapezium.

2x + 13x -84 = 0
Factorise
(2x + 21)(x-4) = 0
X = 4, -10.5
X must = 4

Using Pythagoras:
3^2+ 4^2= CD^2
CD =√25
CD = 5

Total perimeter
= 5 + 12 + 9 + 4 = 30

30

.... cm

(5)

(Total for Question is 7 marks)

**5** The grouped frequency table gives information about the ages of 200 elephants.

Age (*t* years)	Frequency
$0 < t \leqslant 10$	55
$10 < t \leqslant 20$	60
$20 < t \leqslant 30$	40
$30 < t \leqslant 40$	22
$40 < t \leqslant 50$	13
$50 < t \leqslant 60$	10

(a) Complete the cumulative frequency table.

Age (*t* years)	Cumulative frequency
$0 < t \leqslant 10$	55
$0 < t \leqslant 20$	115
$0 < t \leqslant 30$	155
$0 < t \leqslant 40$	177
$0 < t \leqslant 50$	190
$0 < t \leqslant 60$	200

(1)

(b) On the grid, draw a cumulative frequency graph for your table.

Cumulative frequency

Age (*t* years)
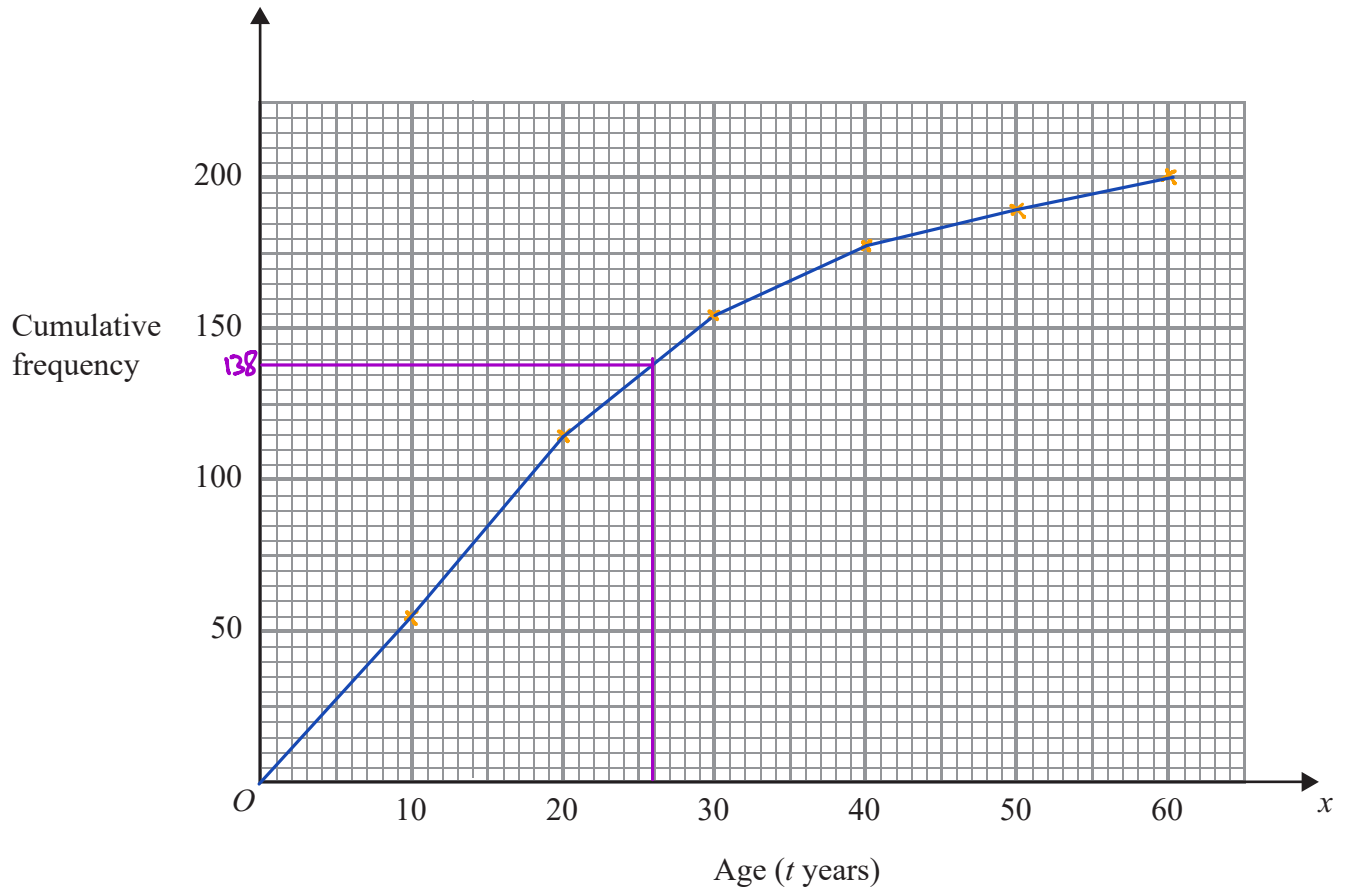
(2)

(c) Use the graph to find an estimate for the number of elephants with ages of more than 26 years.

Cf = 138
Frequency greater:
20-138 = 62

62
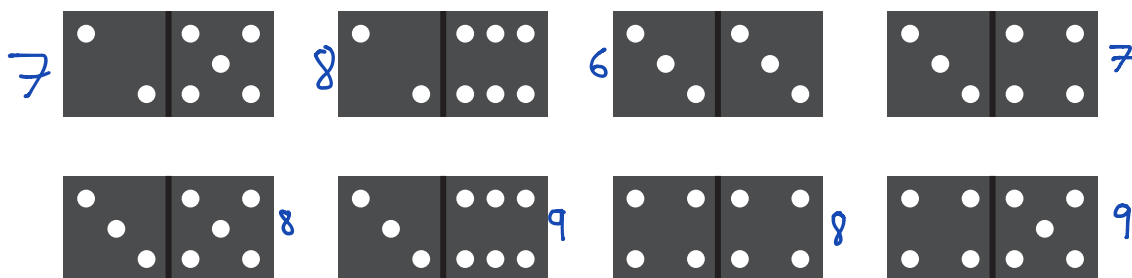
....

(2)

(Total for Question is 5 marks)

6 Here are 8 dominoes.

7   8   6   7

8   9   8   9

The 8 dominoes are put in a bag.

Riaz takes at random a domino from the bag.

(a) Find the probability that he takes a domino with a total of 8 spots or a domino with a total of 9 spots.

Two dominos have a total of 9 spots
2/8 dominos

3 dominos have a total of 8 spots
3/8

Sum = 2/8 + 3/8 =5/8

5/8
....

(2)

Helima takes at random 2 dominoes from the bag of 8 dominoes without replacement.

(b) Work out the probability that

(i) the total number of spots on the two dominoes is 18

Only possibility for a sum of 18 is 9 the 9 dots.

2/8 x 1/7 = 2/56

........2/56........

(ii) the total number of spots on the two dominoes is 17

Possible combinations that lead to a total of 17:
9,8 & 8,9

2/8 x 3/7 + 3/8 x 2/7 = 12/56

........12/56........

(5)

(Total for Question is 7 marks)

7 $f(x) = \sqrt{x-6}$

(a) Find f(10)

$$f(10) = \sqrt{10-6}$$
$$= \sqrt{4} = 2$$

................2................
(1)

(b) State which values of x must be excluded from a domain of f

Any value of x less than 6

................$x<6$................
(2)

The diagram shows part of the graph of $y = g(x)$
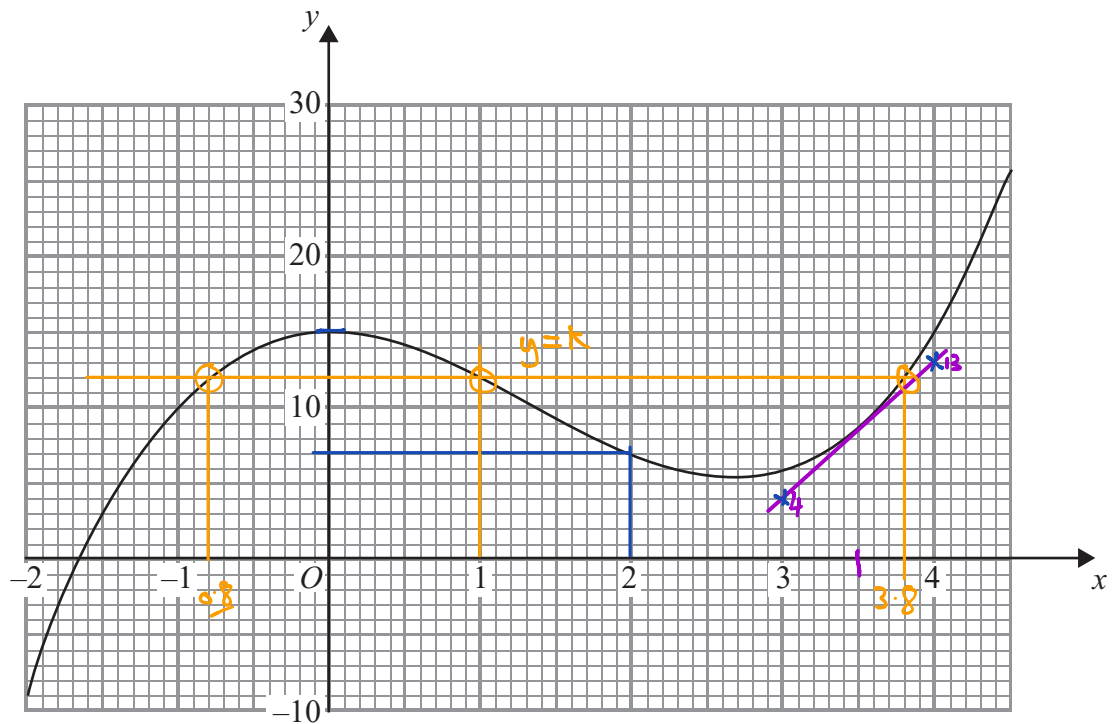
(c) Find g(2)

$$y = g(2) \quad \therefore x = 2$$
$$y = 7$$

................7................
(1)

(d) Find fg(0)

$$g(0) = 15$$
$$f(g(0)) = f(15) = \sqrt{15 \cdot 6} = 3$$

3
....
(2)

(e) One of the solutions of g(x) = k, where k is a number, is x = 1

Find the other solutions.
Give your answers correct to 1 decimal place.

$$x = -0.8, 1, 3.8$$

-0.8,3.8
....
(3)

(f) Find an estimate for the gradient of the curve at the point where x = 3.5
Show your working clearly.

$$\frac{rise}{run} = \frac{13 \cdot 4}{4-3} \quad \frac{9}{1} = 9$$

9
....
(3)

(Total for Question is 12 marks)

8

8 cm

4 cm

$x°$

6 cm
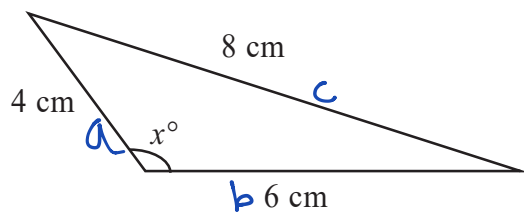
Diagram **NOT** accurately drawn

Calculate the value of x.
Give your answer correct to 1 decimal place.

Using the c = b + a - 2abcos(x)

$c^2 = b^2 + a^2 - 2abcos(x)$

$8^2 = 6^2 + 4^2 - 2(6)(4)(cos(x))$

64 -(36 + 16) = - 2 (24) cos(x)
-(64-52) = 48 cos (x)
-12/48 = cos(x)
x = 104.5

104.5

$x =$ ....

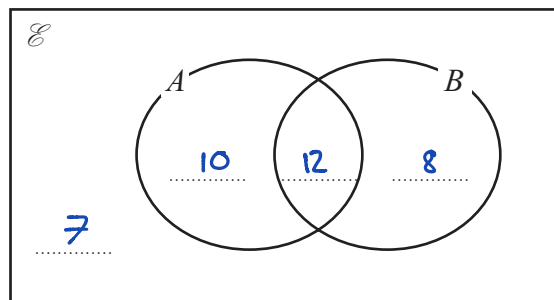**(Total for Question is 3 marks)**

9 *A* and *B* are two sets.

n($\mathscr{E}$) = 37

n(*A*) = 22

n(*A* ∩ *B*) = 12

n(*A* ∪ *B*) = 30

(a) Complete the Venn Diagram to show the **numbers** of elements.

(2)

(b) Find   (i) n(*A* ∩ *B'*)

10

(ii) n(*A'* ∪ *B'*)

25

(2)

(Total for Question is 4 marks)