

# Gold Level

## Model Answers 5

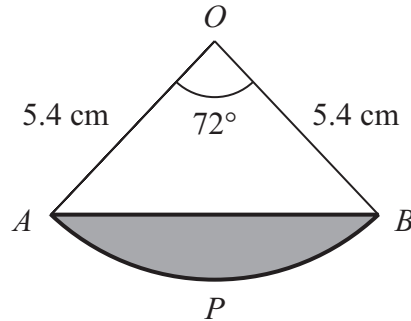
Level	IGCSE
Subject	Maths
Exam Board	Edexcel
Difficulty Level	Gold
Booklet	Model Answers 5

**Time Allowed:** 59 minutes

**Score:** / 49

**Percentage:** /100

1

Diagram NOT  
accurately drawn

The diagram shows a sector  $OAPB$  of a circle, centre  $O$ .

$AB$  is a chord of the circle.

$OA = OB = 5.4$  cm.

Angle  $AOB = 72^\circ$

Calculate the area of the shaded segment  $APB$ .

Give your answer correct to 3 significant figures.

$$\frac{72^\circ}{360^\circ} \times \text{Area of full circle}$$

$$\rightarrow \frac{72}{360} \times \pi (5.4)^2$$

$$\rightarrow \text{area of Sector} = 18.3121$$

$$18.312 - 13.866 \dots$$

(area of triangle)

$$\rightarrow \underline{4.46}$$

$$\underline{4.46} \text{ cm}^2$$

(Total for Question is 5 marks)

2 Correct to 2 decimal places, the volume of a solid cube is  $42.88 \text{ cm}^3$

Calculate the lower bound for the surface area of the cube.

$$LB = \underline{42.875}$$

$$\sqrt[3]{42.875} = \underline{3.5} \rightarrow \text{side length}$$

$$6 \times 3.5^2$$

$$= \underline{73.5 \text{ cm}^2}$$

$$\underline{\underline{73.5}} \text{ cm}^2$$

(Total for Question is 4 marks)

3 Solve the simultaneous equations

$$\textcircled{1} \quad y = 2x^2$$

$$\textcircled{2} \quad y = 20 - 3x$$

Show clear algebraic working.

Sub  $\textcircled{1}$  into  $\textcircled{2}$

$$2x^2 = 20 - 3x$$

$$2x^2 - 3x - 20 = 0$$

$$(2x - 5)(x + 4) = 0$$

$$x = \frac{5}{2}, \quad x = -4$$

$$\therefore y = \frac{25}{2}, \quad y = \underline{32}$$

$$\left(\frac{5}{2}, \frac{25}{2}\right) \text{ or } (-4, 32)$$

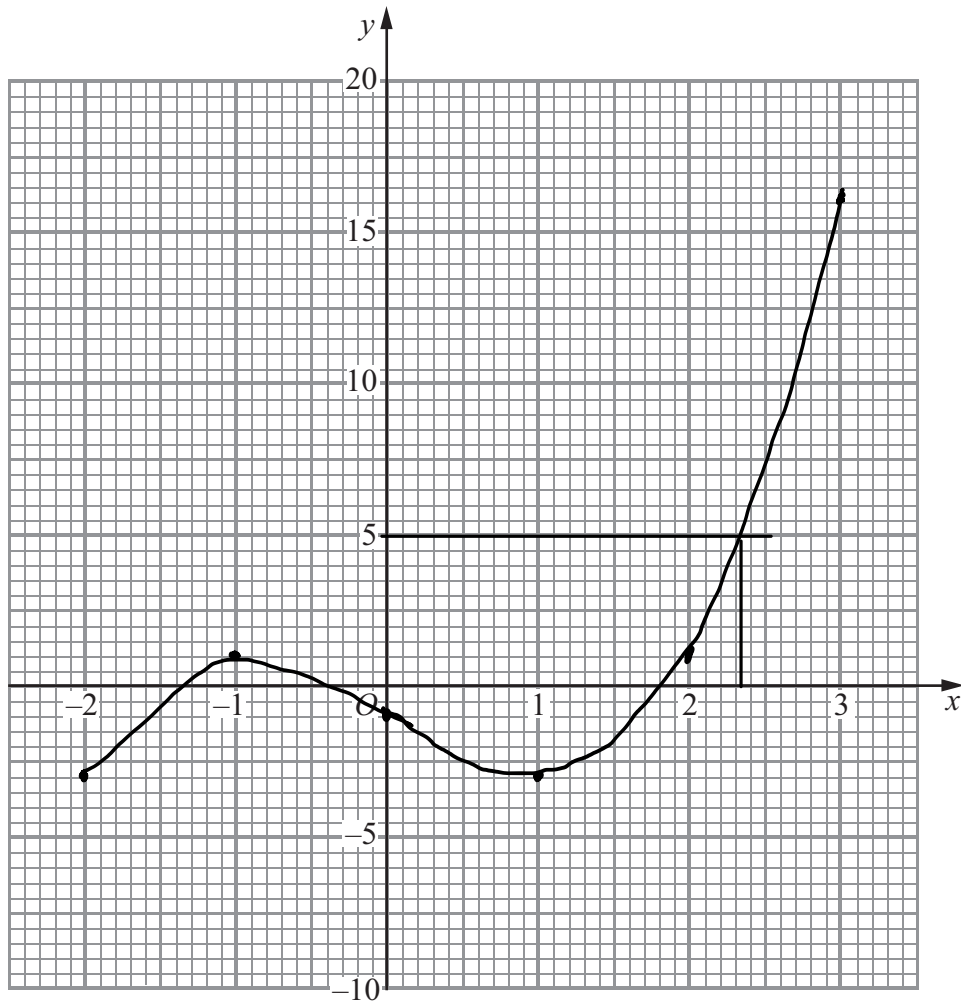
(Total for Question is 5 marks)

4 (a) Complete the table of values for  $y = x^3 - 3x - 1$

$x$	-2	-1	0	1	2	3
$y$	-3	1	-1	-3	1	17

(2)

(b) On the grid, draw the graph of  $y = x^3 - 3x - 1$  for  $-2 \leq x \leq 3$



(2)

(c) By drawing a suitable straight line on the grid, find an estimate for the solution of the equation  $x^3 - 3x - 6 = 0$   
Give your answer correct to 1 decimal place.

2.3 (2)

(d) For the curve with equation  $y = x^3 - 3x - 1$

(i) find  $\frac{dy}{dx}$

$$\frac{dy}{dx} = 3x^2 - 3 + 0$$

$$\underline{3x^2 - 3}$$

(ii) find the gradient of the curve at the point where  $x = 4$

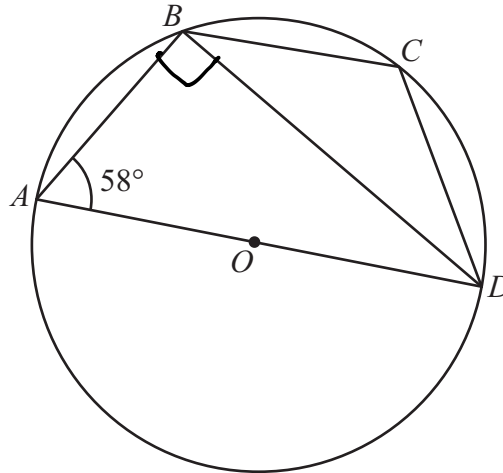
$$\frac{dy}{dx} = 3(4)^2 - 3$$

$$= \underline{\underline{45}}$$

$$\underline{\underline{45}} \quad (4)$$

(Total for Question is 10 marks)

5

Diagram **NOT**  
accurately drawn

$A, B, C$  and  $D$  are four points on a circle, centre  $O$ .  
 $AD$  is a diameter of the circle.

Angle  $BAD = 58^\circ$

(a) Calculate the size of angle  $ADB$ .

$$\angle ABD = 90^\circ \quad (\text{angle at circumference} = \frac{1}{2} \text{ at center})$$

$$\therefore \angle ADB = 180 - 90 - 58$$

$$= 32$$

(2)

(b) (i) Calculate the size of angle  $BCD$ .

opposite angles in a cyclic quadrilateral

$$\angle BCD = 180 - 58$$

$$= 122$$

(ii) Give a reason for your answer.

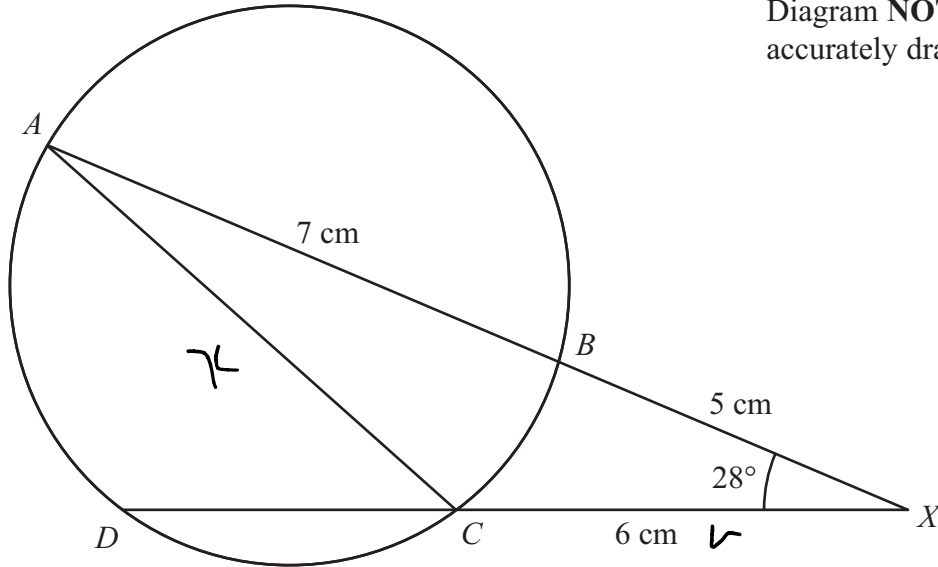
opposite angles in a cyclic quadrilateral  
add to  $180^\circ$

(2)

(Total for Question is 4 marks)

6

Diagram NOT accurately drawn



$A, B, C$  and  $D$  are four points on a circle.  
 $ABX$  and  $DCX$  are straight lines.  
 $AB = 7$  cm,  $BX = 5$  cm and  $CX = 6$  cm.  
 Angle  $BXC = 28^\circ$

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

cosine rule:

$$x^2 = 6^2 + (7+5)^2 - 2 \times 6 \times (7+5) \cos(28)$$

$$x^2 = 52.855$$

$$x \approx 7.27 \text{ (3sf)}$$

$$\underline{\underline{7.27}} \text{ cm} \quad (3)$$

- (b) Calculate the length of  $DC$ .

(chord theorem)

$$6 \times DX = 12 \times 5 \quad DC = 10 - 6$$

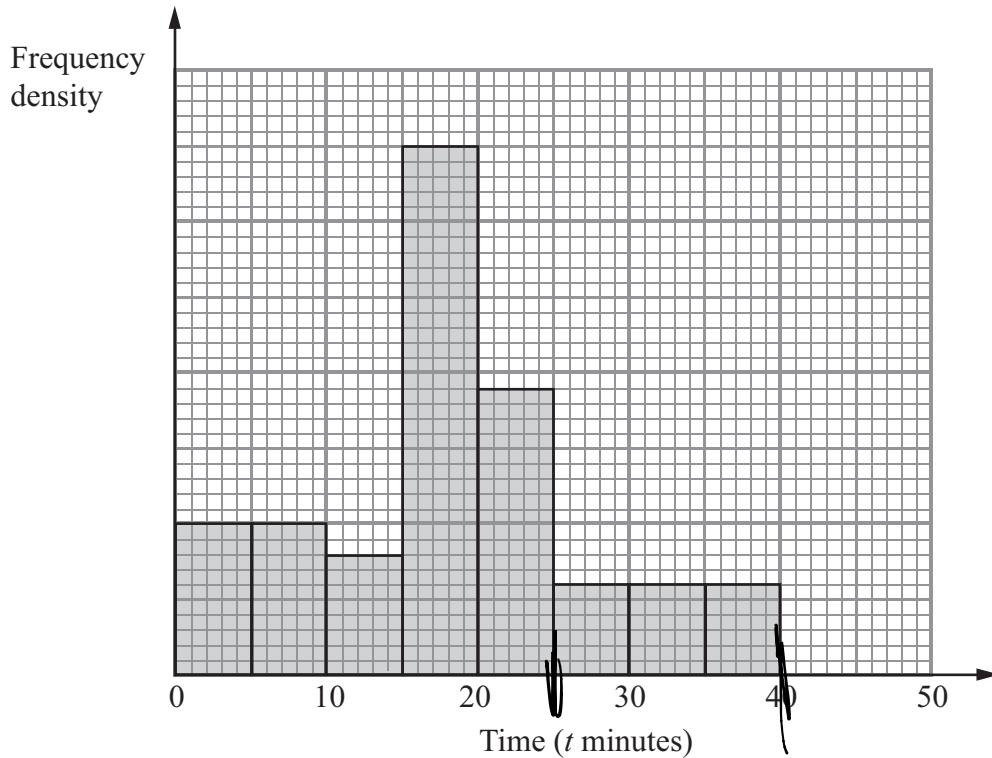
$$DX = \frac{12 \times 5}{6} = 10$$

$$\underline{\underline{4}} \text{ cm} \quad (3)$$

(Total for Question is 6 marks)



- 7 The histogram shows information about the times,  $t$  minutes, patients spent at a doctors' surgery on one day.  
No patient spent more than 40 minutes at the surgery.



- (a) Calculate the percentage of the patients who spent between 25 and 40 minutes at the surgery.

$$\text{total} = 10 + 10 + 8 + 35 + 19 + 6 + 6 + 6 = 100$$

$$\% \rightarrow \frac{6 + 6 + 6}{\text{total}} \times 100 = \underline{\underline{18}}$$

..... 18 ..... %  
(3)

- (b) 16 patients spent between 10 and 15 minutes at the surgery.

Calculate the total number of patients at the surgery that day.

$$1.8 \text{ large squares} = 18 \text{ people}$$

$$\therefore 1 \text{ large square} = 10 \text{ people}$$

$$20 \times 10 = 200 \text{ people}$$

..... 200 .....  
(2)

(Total for Question is 5 marks)

8 Bill and Jo play some games of table tennis.

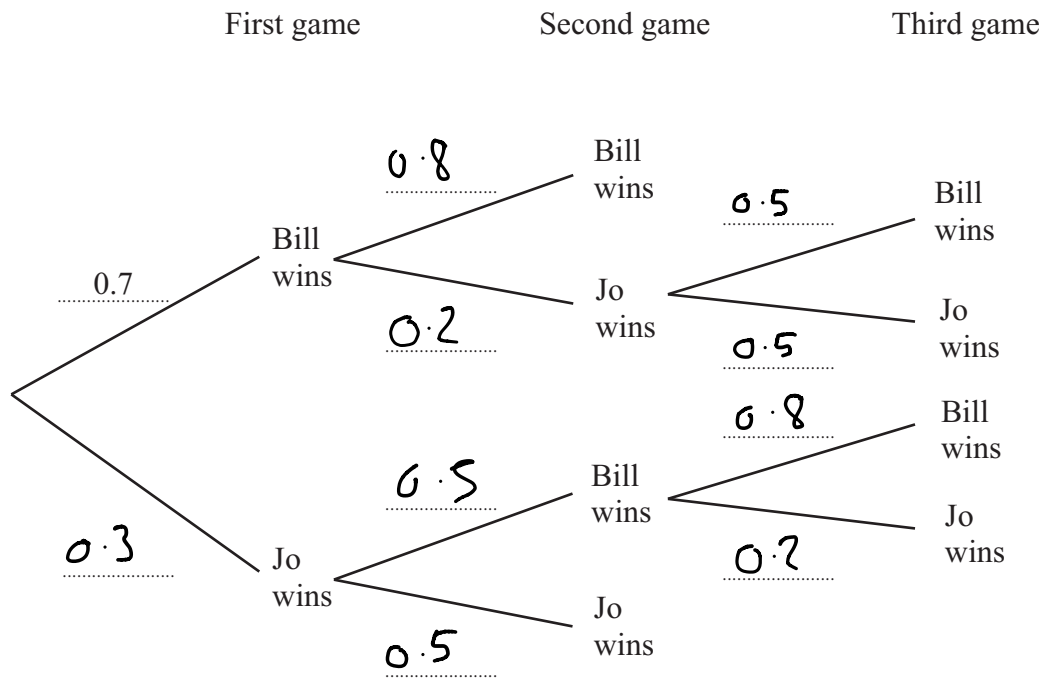
The probability that Bill wins the first game is 0.7

When Bill wins a game, the probability that he wins the next game is 0.8

When Jo wins a game, the probability that she wins the next game is 0.5

The first person to win two games wins the match.

(a) Complete the probability tree diagram.



(3)

(b) Calculate the probability that Bill wins the match.

$$\begin{aligned}
 & 0.7 \times 0.8 \\
 + & 0.7 \times 0.2 \times 0.5 \\
 + & 0.3 \times 0.5 \times 0.8
 \end{aligned}$$

$$= \underline{\underline{0.75}}$$

$$\underline{\underline{0.75}}$$

(3)

(Total for Question is 6 marks)

9

$$f(x) = 3x - 2$$

$$g(x) = \frac{10}{x+2}$$

(a) Express the inverse function  $f^{-1}$  in the form  $f^{-1}(x) = \dots$

$$y = 3x - 2 \quad \rightarrow \quad 2 + y = 3x \quad \rightarrow \quad \frac{2+y}{3} = x$$

Swap  $x, y$

$$\frac{2+x}{3} = y$$

$$f^{-1}(x) = \frac{2+x}{3} \quad (2)$$

(b) Find  $gf(x)$   
Simplify your answer.

$$g(3x-2) = \frac{10}{3x-2+2} \quad \rightarrow \quad \frac{10}{3x}$$

$$gf(x) = \frac{10}{3x} \quad (2)$$

(Total for Question is 4 marks)