

Gold Level

Model Answers 8

Level	IGCSE
Subject	Maths
Exam Board	Edexcel
Difficulty Level	Gold
Booklet	Model Answers 8

Time Allowed: 60 minutes

Score: / 50

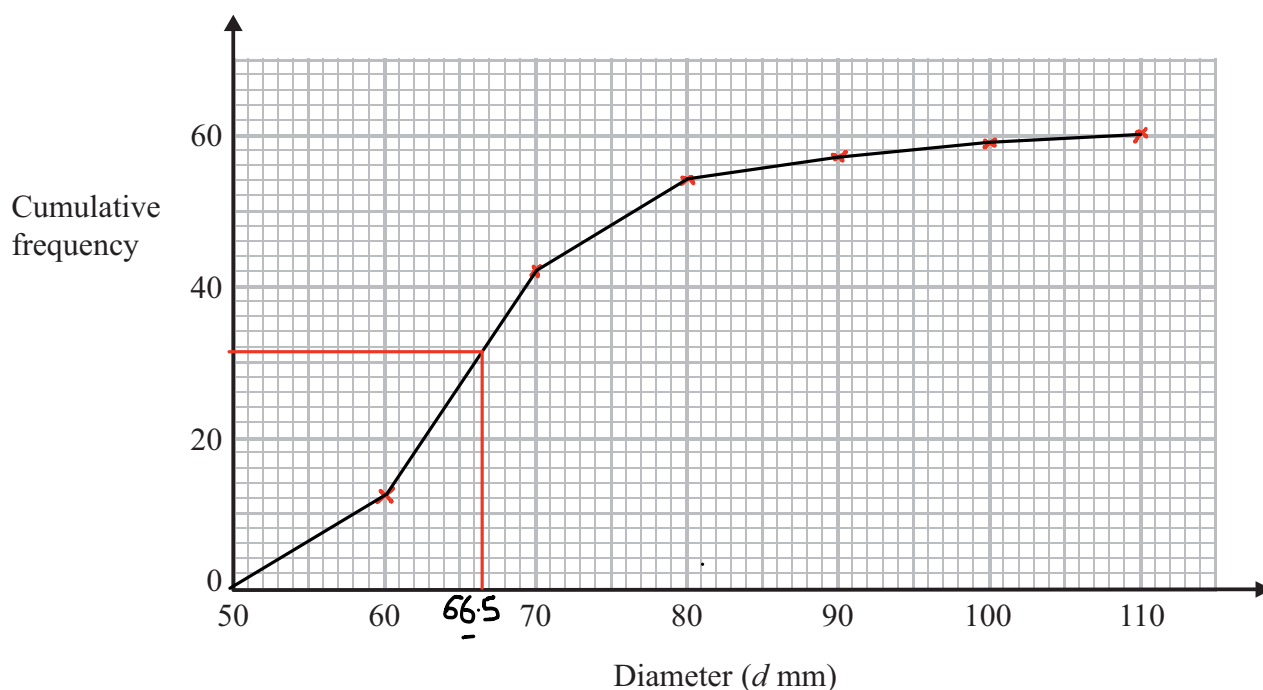
Percentage: /100

1 The cumulative frequency table shows information about the diameters of 60 oranges.

Diameter (d mm)	Cumulative frequency
$50 < d \leq 60$	12
$50 < d \leq 70$	42
$50 < d \leq 80$	54
$50 < d \leq 90$	57
$50 < d \leq 100$	59
$50 < d \leq 110$	60

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

(2)



(b) Use your graph to find an estimate for the median diameter of the 60 oranges.

$$\text{median} = \frac{60+1}{2} = \underline{30.5}$$

$$\underline{\underline{66.5}} \text{ mm}$$

(2)

(Total for Question is 4 marks)

2

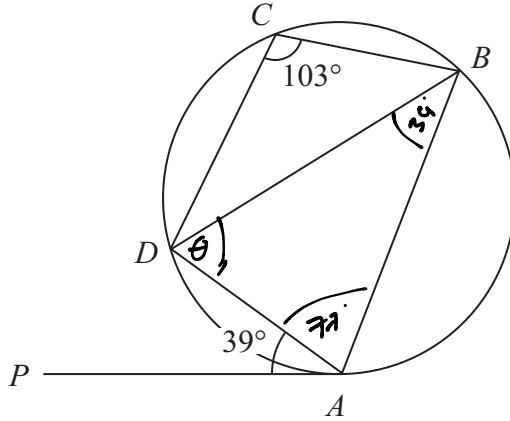


Diagram NOT accurately drawn

A, B, C and D are points on a circle.
 PA is a tangent to the circle.
 Angle $PAD = 39^\circ$
 Angle $BCD = 103^\circ$

Calculate the size of angle ADB .

$\angle DAB$ is $180 - 103$ Due to cyclic angles in a quadrilateral.
 $\therefore \angle DAB = 77^\circ$

$$\angle BAD = 39^\circ$$

$$\therefore \theta + 39 + 77 = 180$$

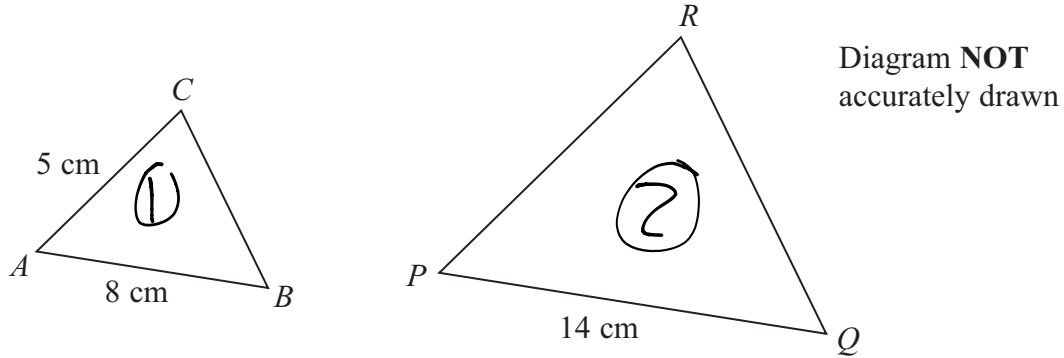
$$\therefore 180 - 39 - 77 = \theta$$

$$= 64^\circ$$

64

(Total for Question is 3 marks)

3



Triangle ABC is similar to triangle PQR .
 AB corresponds to PQ .
 AC corresponds to PR .
 $AB = 8$ cm.
 $AC = 5$ cm.
 $PQ = 14$ cm.

(a) Calculate the length of PR .

Sides of ② = side of ① \times a scale factor

$$14 = 8 \times SF$$

$$\frac{14}{8} = SF = \frac{7}{4}$$

$$PR = AC \times SF$$

$$PR = \frac{7}{4} \times 5 \quad PR = \frac{35}{4}$$

$$\underline{\underline{8.75}} \text{ cm} \quad (2)$$

The area of triangle ABC is 16 cm^2

(b) Calculate the area of triangle PQR .

$$\text{Area of triangle} = \frac{1}{2} b \times h$$

$$\therefore \text{scaled triangle area} = \frac{1}{2} (b \times SF)(h \times SF)$$

$$(A_1)(SF^2) = A_2$$

$$(16)\left(\frac{7}{4}\right)^2 = \underline{\underline{49}}$$

$$\underline{\underline{49}} \text{ cm}^2 \quad (3)$$

(Total for Question is 5 marks)

4 Parveen travels to school either by bicycle or by bus.

The probability that, on any day, she will travel by bicycle is 0.7

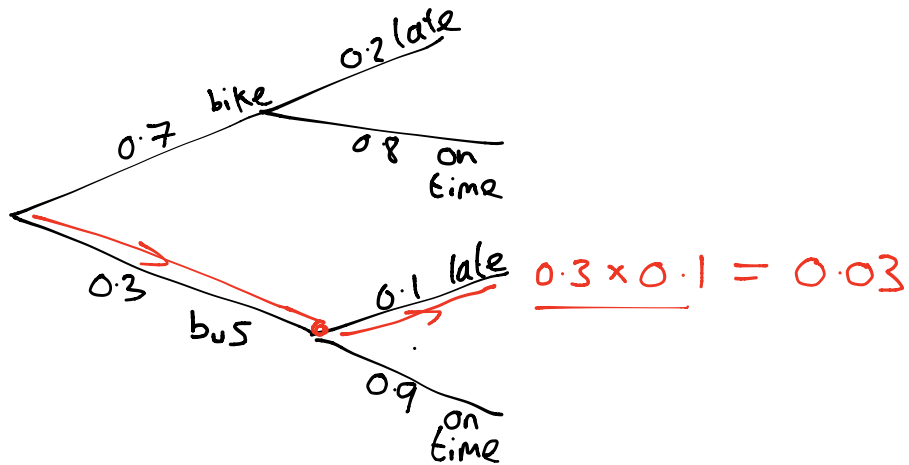
When she travels by bicycle, the probability that she will be late for school is 0.2

When she travels by bus, the probability that she will be late for school is 0.1

(a) Calculate the probability that, on a randomly chosen day, Parveen will travel by bus and be late for school.

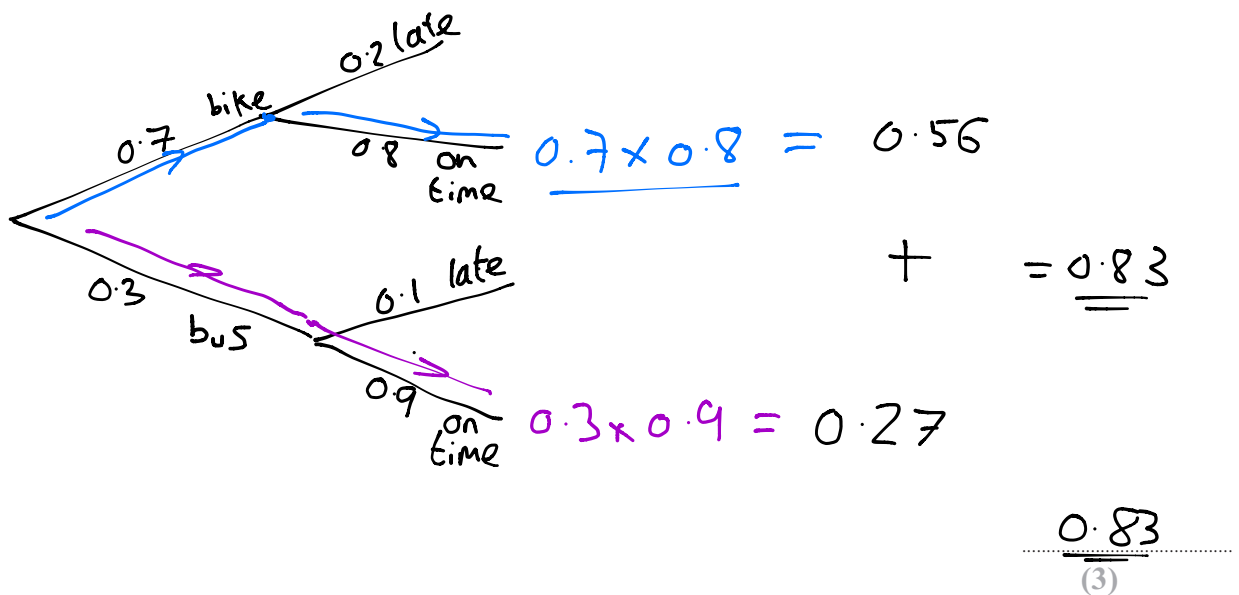
Total probability = 1

$$\therefore \text{Probability that bicycle is not taken} = 1 - 0.7 = 0.3$$



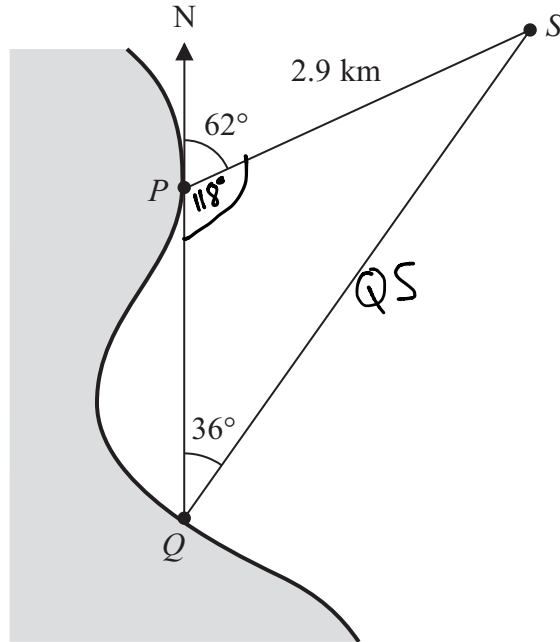
(b) Calculate the probability that, on a randomly chosen day, Parveen will not be late for school.

Probability of not being late is bus + on time and bike + on time



(Total for Question is 5 marks)

5

Diagram NOT
accurately drawn

P and Q are two points on a coast.

P is due North of Q .

A ship is at the point S .

$PS = 2.9$ km.

The bearing of the ship from P is 062°

The bearing of the ship from Q is 036°

Calculate the distance QS .

Give your answer correct to 3 significant figures.

Angles on a straight line add to 180 degrees

$$\therefore \angle QPS = 180 - 62^\circ$$

Applying the sine rule :

$$\frac{PS}{\sin(118)} = \frac{2.9}{\sin 36}$$

$$PS = \frac{2.9}{\sin(36)} \times \sin(118) = 4.36\dots \\ \approx 4.36 \text{ (3sf)}$$

4.36 km

(Total for Question is 3 marks)

- 6 (a) Correct to the nearest millimetre, the length of a side of a regular hexagon is 3.6 cm.

Calculate the upper bound for the perimeter of the regular hexagon.

$$\begin{aligned} \text{Lower bound of } 3.6 \\ = \underline{\underline{3.55}} \end{aligned}$$

Hexagon has 6 sides

$$\begin{aligned} \therefore \text{Perimeter} &= 6 \times L = 6 \times 3.55 \\ &= \underline{\underline{21.9}} \end{aligned}$$

$$\begin{array}{r} \dots\dots\dots 21.9 \text{ cm} \\ (2) \end{array}$$

- (b) Correct to 1 significant figure, the area of a rectangle is 80 cm²
Correct to 2 significant figures, the length of the rectangle is 12 cm.

Calculate the lower bound for the width of the rectangle.
Show your working clearly.

Lower bound of area is 75

Upper bound of length is 12.5

To find lowest bound of the width, divide the lowest value of the area by the highest possible length.

$$\frac{75}{12.5} = \underline{\underline{6}}$$

$$\begin{array}{r} \dots\dots\dots 6 \text{ cm} \\ (3) \end{array}$$

(Total for Question is 5 marks)

7

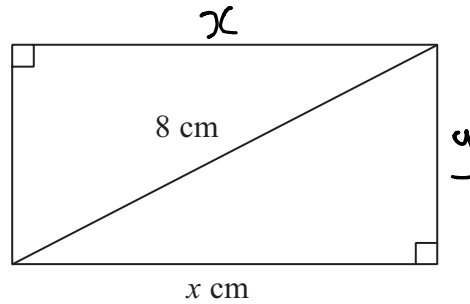


Diagram NOT accurately drawn

The diagram shows a rectangle.
 The length of the rectangle is x cm.
 The length of a diagonal of the rectangle is 8 cm.
 The perimeter of the rectangle is 20 cm.

(a) Show that $x^2 - 10x + 18 = 0$

Using Pythagoras

$$8^2 = x^2 + y^2$$

$$\therefore y^2 = 8^2 - x^2 \quad (1)$$

Perimeter = 20

$$\therefore 2x + 2y = 20$$

$$x + y = 10$$

$$y = 10 - x \quad (2)$$

Sub 2 into 1

$$(10 - x)^2 = 64 - x^2$$

$$+ x^2 - 20x + 100 = 64 - x^2$$

$$2x - 20x + 100 = 64 \quad \div 2$$

$$x - 10x + 50 = 32$$

$$x - 10x + 18 = 0 \quad -32$$

Q.E.D (4)

(b) Solve $x^2 - 10x + 18 = 0$

Give your solutions correct to 3 significant figures.

Show your working clearly.

Applying quadratic formula

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\rightarrow \frac{-(-10) \pm \sqrt{(-10)^2 - 4(1)(18)}}{2(1)}$$

$$\rightarrow \frac{10 \pm \sqrt{100 - 72}}{2}$$

$$\rightarrow \frac{10 \pm \sqrt{28}}{2}$$

$$\rightarrow 5 \pm \frac{\sqrt{4 \times 7}}{2}$$

$$\rightarrow x = 5 \pm \frac{2\sqrt{7}}{2}$$

$$x = 5 \pm \sqrt{7}$$

$$x = 5 + \sqrt{7} \text{ or}$$

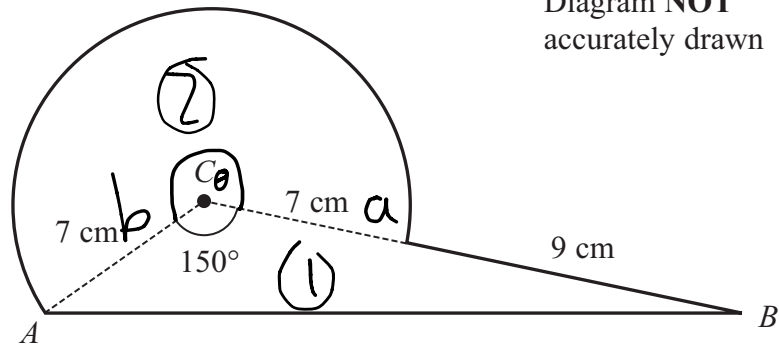
$$x = 5 - \sqrt{7}$$

2.35, 7.65

(3)

(Total for Question is 7 marks)

8 Here is a shape.



The shape is made from triangle ABC and a sector of a circle, centre C and radius CA .

$CA = 7$ cm.

$CB = 16$ cm.

Angle $ACB = 150^\circ$

Calculate the area of the shape.

Give your answer correct to 3 significant figures.

$$\text{Area of a triangle} = \frac{1}{2} a \cdot b \cdot \sin(c)$$

①

$$a = CB = 16$$

$$b = AC = 7$$

$$C = \angle ACB = 150^\circ$$

$$\text{Area} = \frac{1}{2} (7)(16)(\sin(150))$$

$$= \left(\frac{1}{2}\right)(7)(16)\left(\frac{1}{2}\right)$$

$$= 28$$

②

Area of a sector

$$= \pi r^2 \times \frac{\theta}{360}$$

$$\theta = 360 - 150^\circ$$

$$210^\circ$$

$$\text{Area} = \frac{210}{360} \times \pi (7)^2$$

$$= \frac{343\pi}{12}$$

Total area = area of 1 + area of 2

$$= 28 + 89.79\dots$$

$$\approx 118 \text{ (3sf)}$$

$$\underline{118} \dots \text{ cm}^2$$

(Total for Question is 6 marks)

9 Make y the subject of $\frac{y}{x} + \frac{2y}{x+4} = 3$

Show your working clearly and give your answer as simply as possible.

Multiply by x

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

Multiply by $x+4$

$$y(x+4) + 2y(x) = 3(x)(x+4)$$

Simplify

$$\rightarrow yx + 4y + 2yx = 3x^2 + 12x$$

$$\rightarrow 3yx + 4y = 3x^2 + 12x$$

Factorise to remove Y

$$\rightarrow y(3x+4) = 3x^2 + 12x$$

Divide by coefficient of Y

$$\rightarrow y = \frac{3x^2 + 12x}{3x+4}$$

$$y = \frac{3x^2 + 12x}{3x+4}$$

(Total for Question is 5 marks)

- 10 (a) $A = \{s, u, p, e, r\}$
 $B = \{c, o, m, p, u, t, e, r\}$

List the members of the set

(i) $A \cap B$

u,p,e,r

(ii) $A \cup B$

S,c,o,m,p,u,t,e,r

(2)

- (b) $X = \{\text{prime numbers}\}$
 $Y = \{\text{factors of 12}\}$

Is it true that $X \cap Y = \emptyset$?

Tick (✓) the appropriate box.

Yes

No

Explain your answer.

2 and 3 are prime and are both factors of 12. So both belong in X and Y

(1)

(Total for Question is 3 marks)

11 Triangles ABC and ACD are similar.

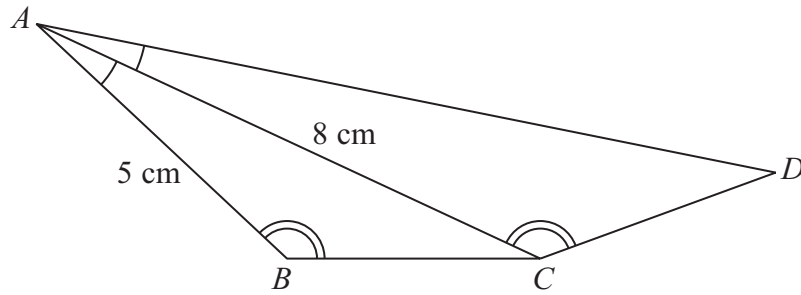
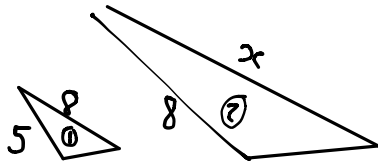


Diagram **NOT** accurately drawn

Angle $BAC =$ angle CAD .
 Angle $ABC =$ angle ACD .
 $AB = 5$ cm and $AC = 8$ cm.

(a) Calculate the length of AD .



Break down into Two similar triangles

$$\frac{8}{5} = \text{Scale factor}$$

$$8 \times \frac{8}{5} = x = \frac{64}{5} = \underline{\underline{12.8}}$$

..... 12.8 cm
 (2)

The area of triangle ABC is 12 cm^2

(b) Calculate the area of triangle ACD .

Areas are proportional to the scale factor of the lengths squared

$$A_{ACD} = A_{ABC} \times \left(\frac{8}{5}\right)^2$$

$$A_{ACD} = 12 \times \left(\frac{64}{25}\right) = \underline{\underline{30.72}}$$

..... 30.72 cm^2
 (2)

(Total for Question is 4 marks)