

Answer all questions

- 1** The scale of a map is 5 cm : 1 km.
(a) Write this scale in the form 1 : n .

Answer [1]

- (b)** A forest is represented by an area of 542 cm^2 on the map.
Calculate the actual area of the forest in square kilometers.

Answer km^2 [2]

- 2 The table shows the sizes of shoes sold in a shop in a particular day.

Size	Frequency
5	4
6	9
7	8
8	12
9	4
10	3

- (a) Find the mean shoe size.

Answer [2]

- (b) Find the modal shoe size.

Answer [1]

- (c) Find the median shoe size.

Answer [1]

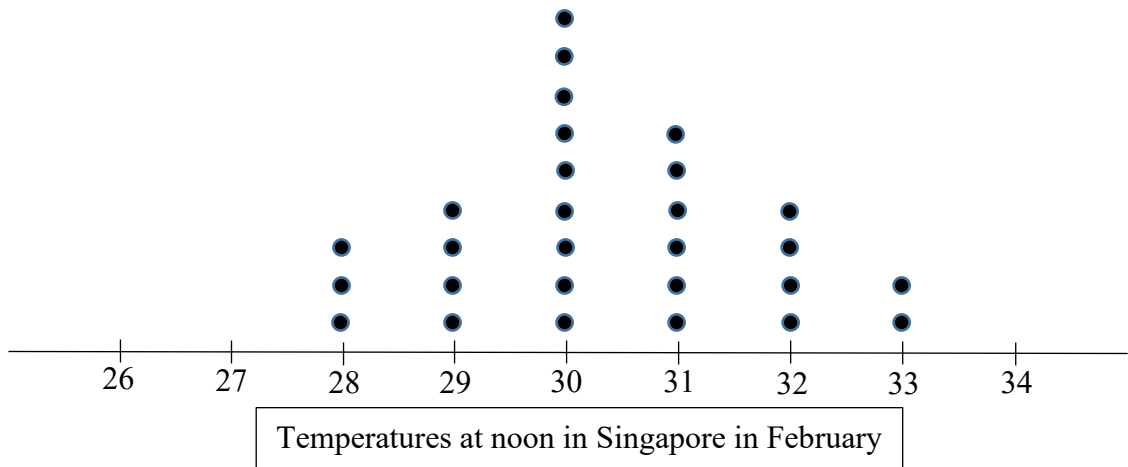
- (d) The shopkeeper wants to order shoes to replenish her stocks.
She is deciding between using the mean, mode or median to make her decision. Suggest which measure she should use, stating your reasoning clearly.

The shopkeeper should use the as

.....

..... [1]

- 3 The dot diagram shows the temperatures, in $^{\circ}\text{C}$, at noon recorded in Singapore in February last year.



- (a) State the highest temperature recorded.

Answer $^{\circ}\text{C}$ [1]

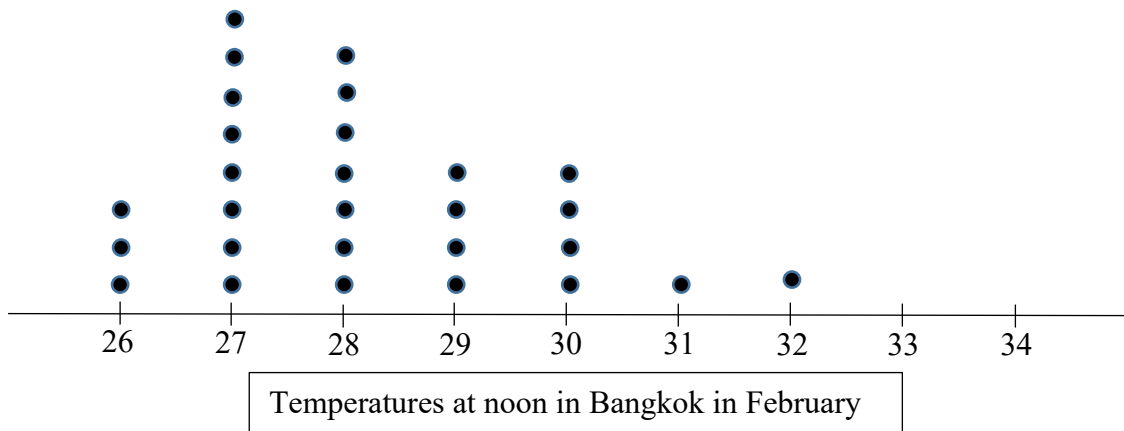
- (b) The same temperature at noon was recorded three times in February.
What was the temperature?

Answer $^{\circ}\text{C}$ [1]

- (c) 25% of the days had a noon temperature that was $x^{\circ}\text{C}$ or lower.
State the value of x .

Answer $x =$ [1]

- (d) The dot diagram below shows the temperatures, in $^{\circ}\text{C}$, at noon recorded in Bangkok in February last year.
Explain briefly whether Bangkok or Singapore was hotter in February?



Answer

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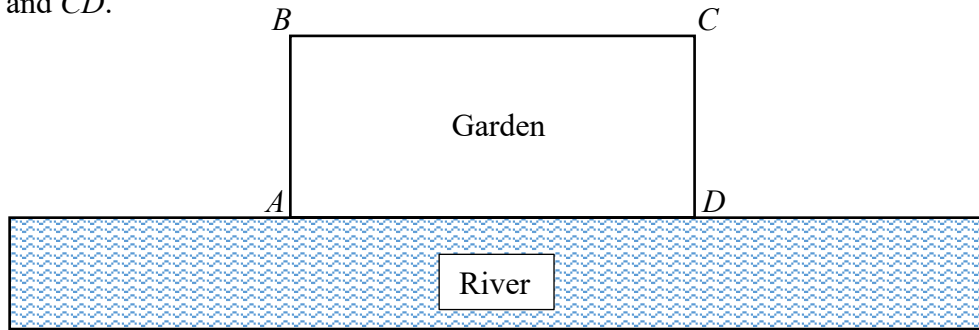
.....

.....[1]

- (e) If the temperatures in Bangkok was represented in a pie chart, calculate the angle representing 27°C .

Answer $^{\circ}$ [2]

- 4 A gardener wishes to build an enclosed rectangular garden along a river, using the river as one of its sides. The garden is constructed using fences along the sides AB , BC and CD .



- (a) Given that $BC = 2x$ metres and the total length of fencing that the gardener used was 46 m, write down an expression, in terms of x , for the length of AB .

Answerm [1]

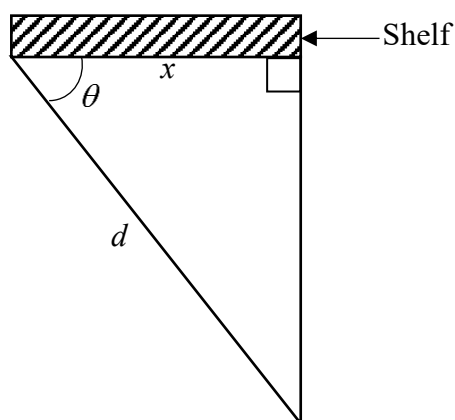
- (b) Given that the area of the garden is 264 m^2 , form an equation in terms of x , and show that it reduces to $x^2 - 23x + 132 = 0$. [3]

Answer

- (c) Solve the equation $x^2 - 23x + 132 = 0$ and state the possible values of BC .

Answer or m [3]

- 5** The diagram shows a shelf bracket which is used to support a shelf. The length of the arm of the bracket, which is adjustable, is d cm and the angle that the bracket makes with the horizontal is θ° . The width of the shelf that the bracket supports is x cm.



- (a)** Find x when $\theta = 60^\circ$ and $d = 20$ cm.

Answercm [2]

The instruction manual for the shelf bracket includes the following information. The maximum load that the shelf bracket can bear is 200 kg. The table below shows the percentage of the maximum load that the shelf bracket can bear when the length, d and the angle, θ of the bracket is changed.

		Length, d cm			
		10	15	20	25
Angle, θ°	30	60%	45%	25%	10%
	45	75%	60%	45%	25%
	60	85%	75%	60%	45%
	75	100%	85%	75%	60%

- (b)** For a loading of 200 kg, state the values of θ and d .

Answer $\theta = \dots\dots\dots^\circ$

$d = \dots\dots\dots$ cm [1]

- (c) (i) Express 170 kg as a percentage of the maximum load 200kg.

Answer% [1]

- (ii) Hence, find the largest value of x when the shelf bracket is loaded with a mass of 170 kg. Show your working and explanation clearly.

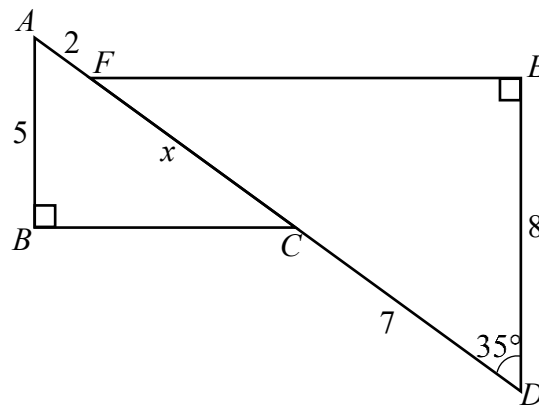
Answercm [3]

6 Which of the following are true? Fill in each box with a True / False.

Answer

- (a) (i) Any two isosceles triangles are always similar. [1]
- (ii) Any two rectangles are always similar. [1]
- (iii) Any two kites are always similar. [1]

- (b) In the diagram, triangle ABC is similar to triangle DEF .
 Angle $EDF = 35^\circ$, $AF = 2$ cm, $AB = 5$ cm, $CD = 7$ cm, $DE = 8$ cm,
 and $CF = x$ cm.



- (i) Find angle ACB .

Answer $^\circ$ [1]

- (ii) Find the length of DF .

Answercm [4]

- 7 (a) Expand and simplify $(3x-1)^2 - 2(2x-3)(2x+3)$.

Answer[3]

- (b) Simplify $\frac{b^2}{2ab^3} \div \frac{8a^2b}{a^3}$.

Answer[2]

- (c) Express $\frac{2x-1}{x^2+x-6} - \frac{5}{x+3}$ as a single fraction.

Answer[3]

- 8 Peter orders x cupboards from a factory in Jurong to sell.
The cost of each cupboard, $\$C$, is given by the equation

$$C = x^2 - 12x + 56.$$

Some corresponding values of x and C are given in the table below.

x	0	2	4	6	9	12	14
C	56	a	24	20	29	56	84

- (a) Find the value of a .

Answer $a = \dots\dots\dots$ [1]

- (b) On the grid on the next page, plot the points given in the table and join them with a smooth curve. [2]

- (c) Use your graph to find the

- (i) cost of each cupboard if Peter orders 13 cupboards.

Answer $\$ \dots\dots\dots$ [1]

- (ii) number of cupboards that Peter should order so that the cost per cupboard is minimum.

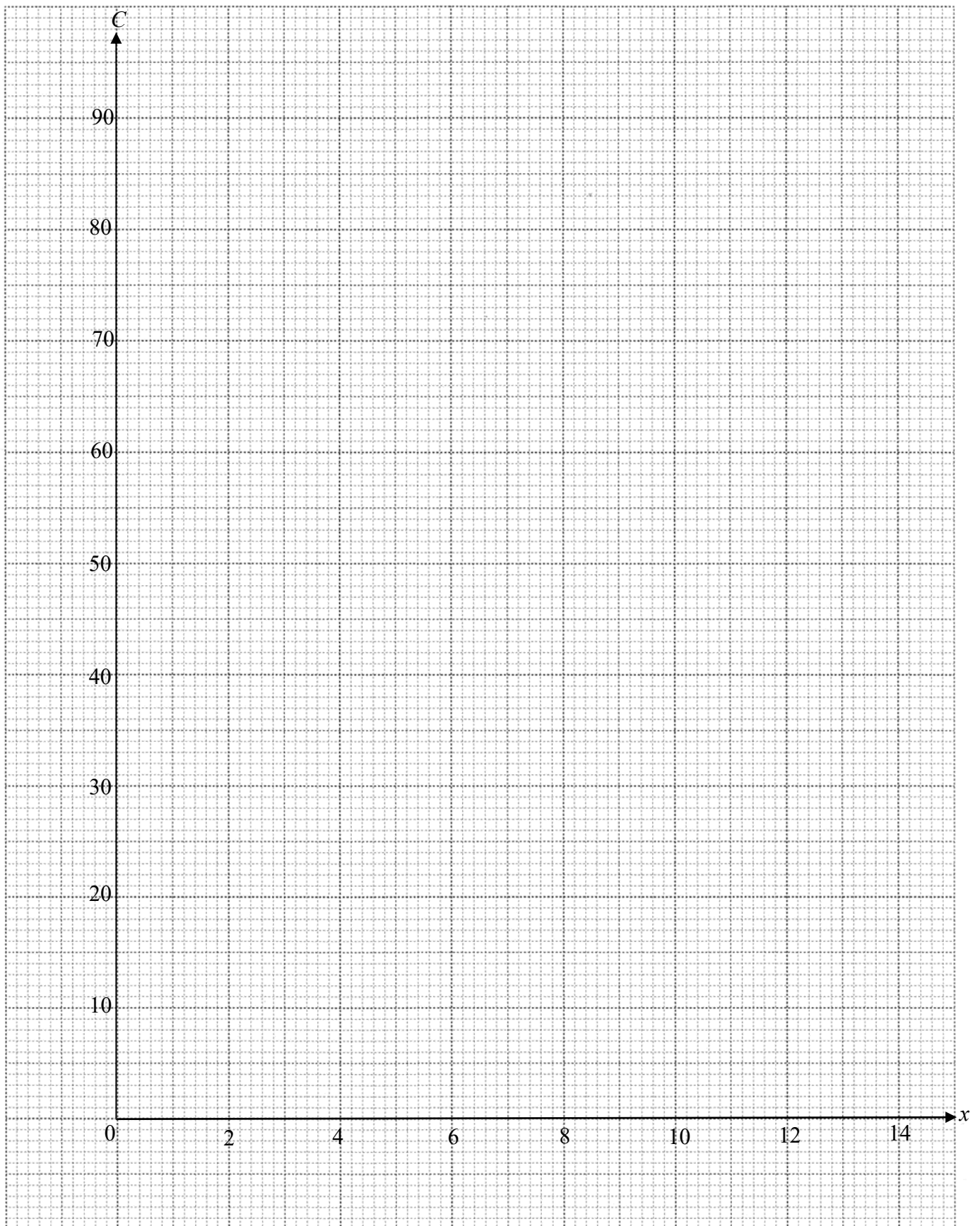
Answer $\dots\dots\dots$ [1]

- (d) Peter sells the cupboards at $\$36$ each.

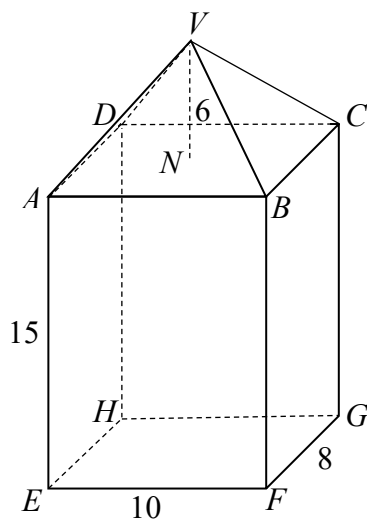
- (i) On the same grid, draw the line $C = 36$. [1]

- (ii) State all the possible number of cupboards that Peter should order if he wants to make a profit from the sale of chairs.

Answer $\dots\dots\dots$ [1]



9



The diagram shows a metallic sculpture which consists of a pyramid, $VABCD$, attached to a cuboid $ABCDEFGH$. $ABCD$ and $EFGH$ are both rectangles. The vertical height of the pyramid is 6 m.

$$AB = CD = EF = GH = 10 \text{ m.}$$

$$AD = BC = EH = FG = 8 \text{ m.}$$

$$AE = BF = CG = DH = 15 \text{ m.}$$

(a) Calculate the volume of the sculpture.

Answerm³ [3]

- (b) Find the surface area of the sculpture.
[Do not include the area of the bottom of the sculpture.]

Answerm² [4]

- (c) The sculpture is to be coated in luminous paint.
Luminous paint costs \$35 per meter square.
Calculate the total cost of painting the sculpture, excluding the bottom, correct to the nearest hundred dollars.

Answer \$..... [2]

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