



GCSE Foundation/Higher 15

Shape, space and measure



Questions



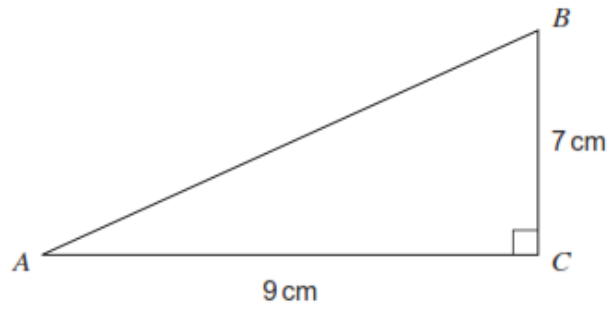
100 minutes



84 marks

Geometrical reasoning

Q1. Work out length AB as a decimal.



Not drawn
accurately

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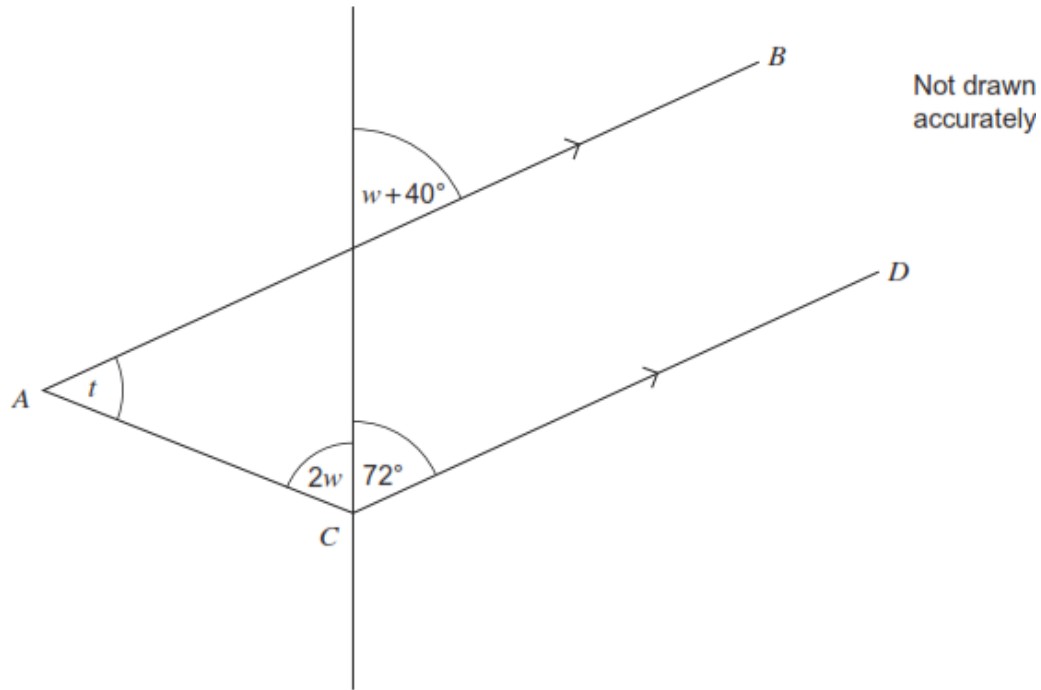
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Answer cm

(Total 3 marks)

Q2. AB is parallel to CD .



Work out the value of t .

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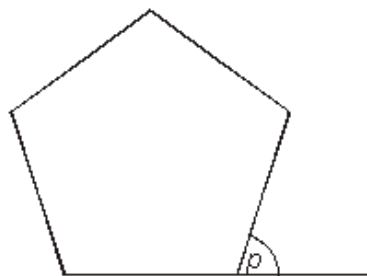
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Answer degrees

(Total 5 marks)

Q3. (a) Explain why the exterior angle of a regular pentagon, marked p on the diagram, is 72° .

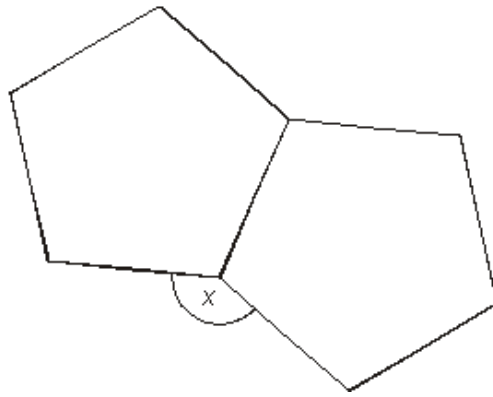


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(1)

- (b) Two identical regular pentagons are joined as shown.



Not drawn accurately

Work out the size of angle x .

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Answerdegrees

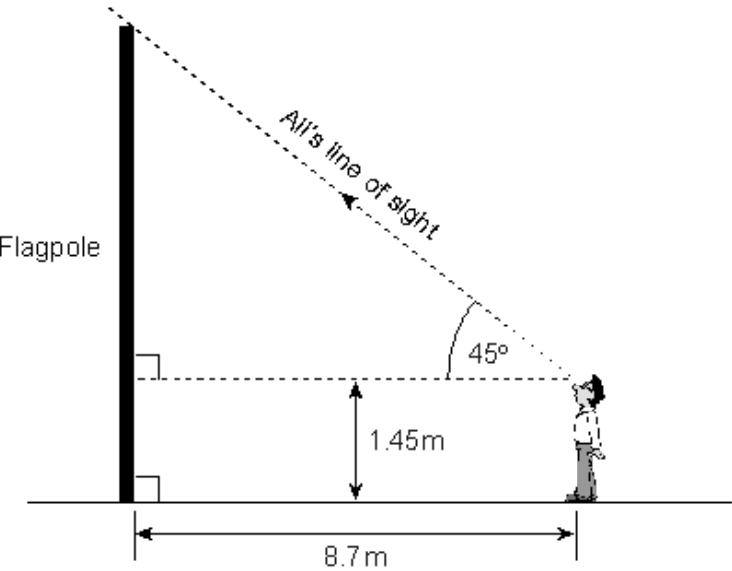
(2)
(Total 3 marks)

- Q4.** (a) Ali uses this method to estimate the height of a flag pole.

- He stands, as shown, so that his angle of sight is 45° when he looks up to the top of the flag pole.
- He then measures his distance from the flagpole.
- Finally he measures the distance that his eyes are above the ground.

This sketch shows Ali's measurements.

Not drawn accurately



Use Ali's measurements to calculate the height of the flag pole, explaining why he uses an angle of 45° .

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Answer m

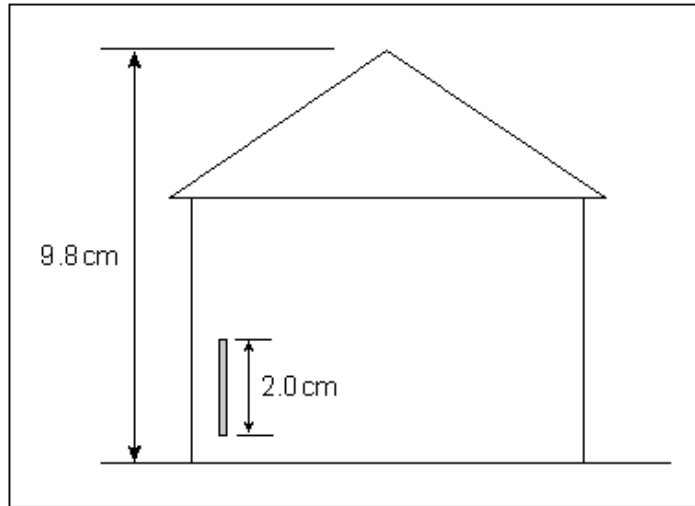
(2)

(b) Ben uses this method to estimate the height of a building.

- He tapes a 1 metre ruler to the building.
- He takes a photograph of the building and the metre ruler.

On the graph he measures the height of the building and the length of the ruler. The measurements are shown on this sketch.

Not drawn accurately



Use this information to estimate the height of the building. Give your answer to the nearest metre.

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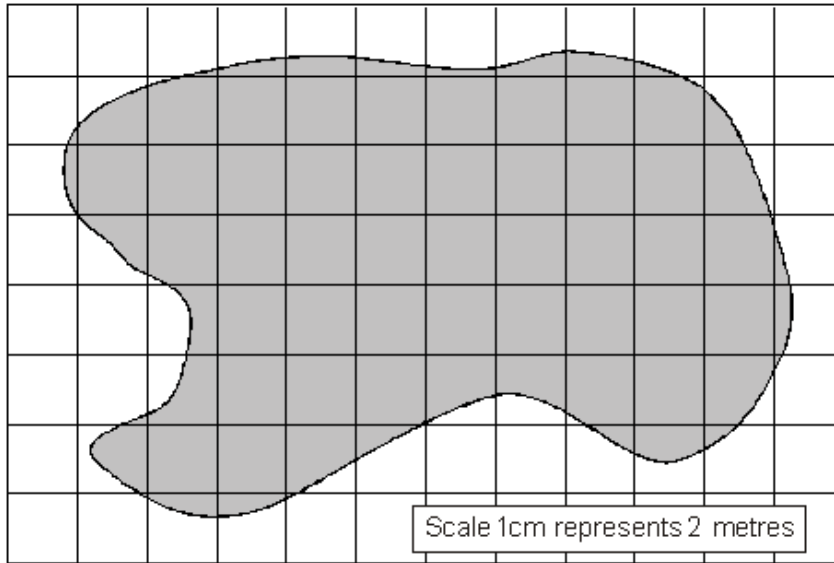
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Answer metres

(3)
(Total 5 marks)

- Q5.** The diagram shows the plan view of a landfill site on a centimetre grid.



- (a) Estimate the number of shaded squares in the diagram.
You **must** show your working.

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Answer

(2)

- (b) A landscape gardener is going to cover the site with turf (grass).

The table shows the cost of turf for different areas (m²).

Area of turf (m ²)	Cost per square metre
40 - 59	£2.83
60 - 130	£2.33
131 - 240	£2.03
241 - 480	£1.78
481 - 640	£1.53
641 - 960	£1.40
961 - 1440	£1.23

On the diagram one square represents 4m².

The landscape gardener must buy enough turf to cover the landfill site.

Work out how much he has to pay.

You **must** show your working.

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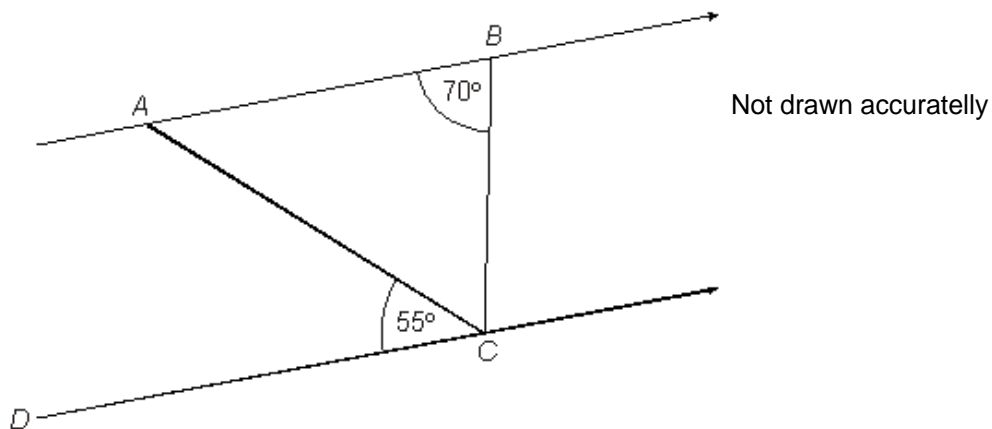
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Answer £

(3)
(Total 5 marks)

- Q6.** In the diagram AB is parallel to DC .
 Angle $ABC = 70^\circ$
 Angle $ACD = 55^\circ$



Show that triangle ABC is isosceles.
 You **must** give reasons in your working.

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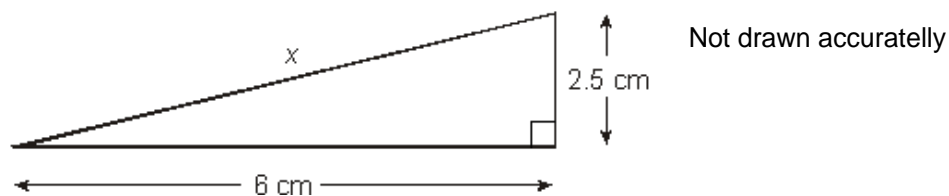
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(Total 3 marks)

- Q7.** The diagram shows a right-angled triangle.



Calculate the length x .

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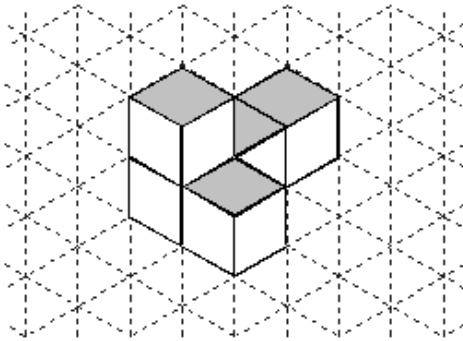
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Answer cm

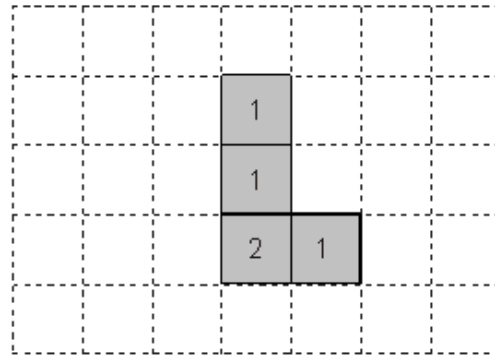
(Total 3 marks)

- Q8.** This solid is made from five cubes.
The plan view shows the number of cubes in each stack.

Solid

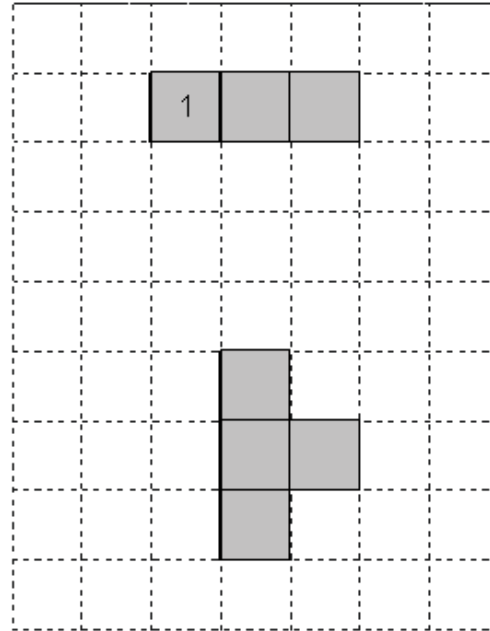
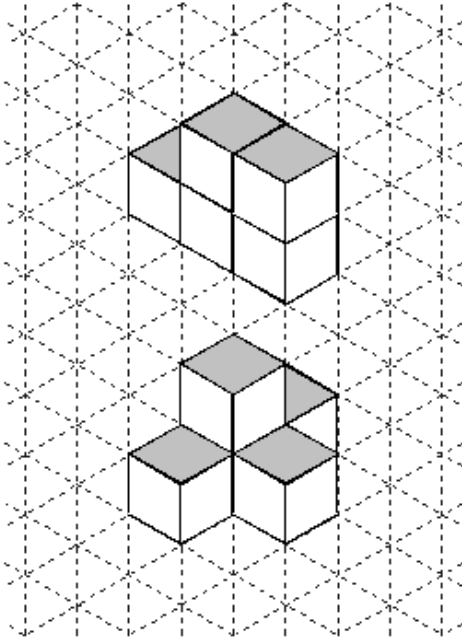


Plan view



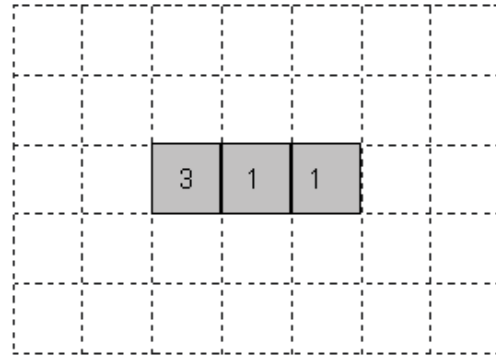
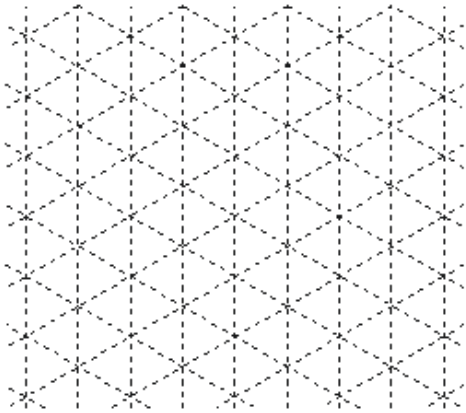
- (a) These solids are also made from five cubes.

Complete the numbers in each stack for each solid.



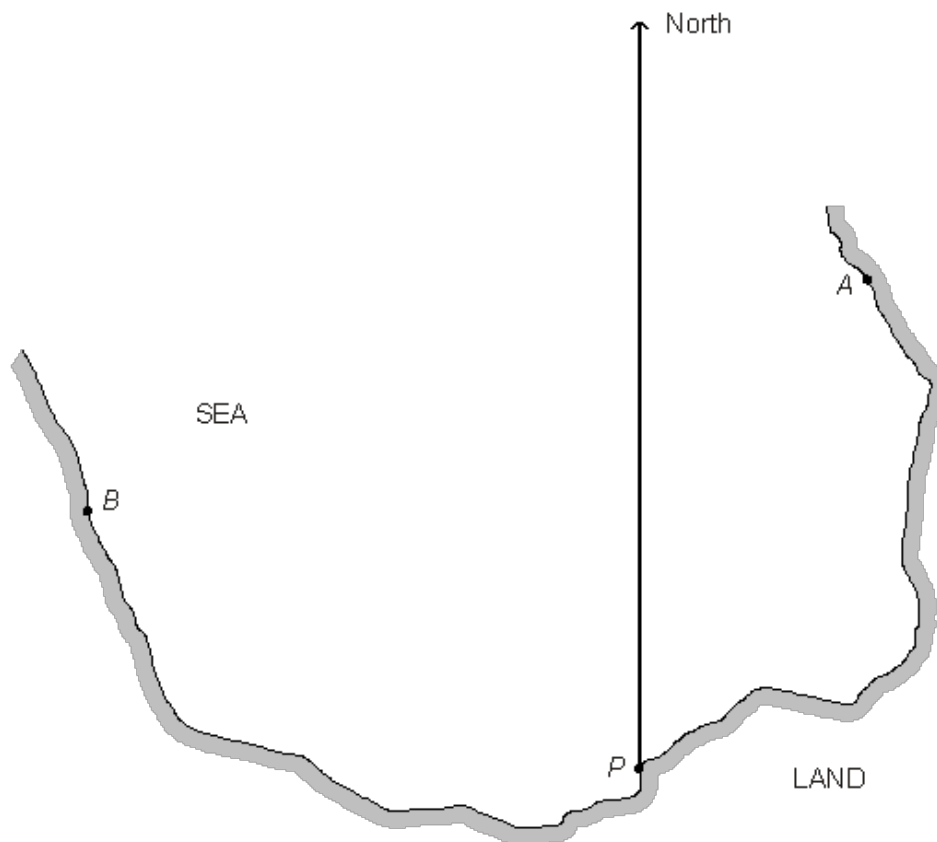
(2)

(b) Draw the solid for this plan view.



(2)
(Total 4 marks)

Q9. The diagram shows a port P and two lighthouses A and B on the coast.



(a) (i) A fishing boat sails to A from P .

What is the three-figure bearing of A from P ?

Answer degrees

(1)

- (ii) A yacht sails to B from P .

What is the three-figure bearing of B from P ?

Answer degrees

(1)

- (b) A ship leaves the port, P , on a course that is an equal distance from PA and PB .

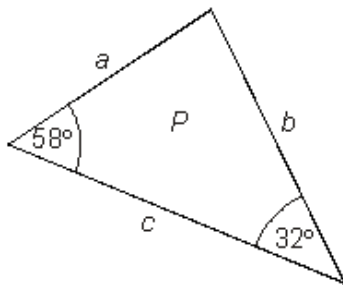
Using ruler and compasses only, construct the course on the diagram.

You **must** show your construction arcs.

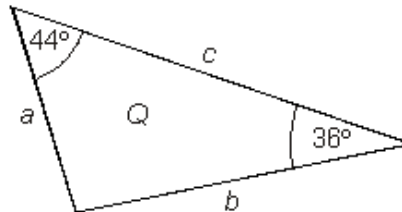
(2)

(Total 4 marks)

Q10. The diagram shows two triangles, P and Q .



Not drawn accurately



In which of these triangles does $a^2 + b^2 = c^2$?

Explain your answer.

Triangle

Explanation.....

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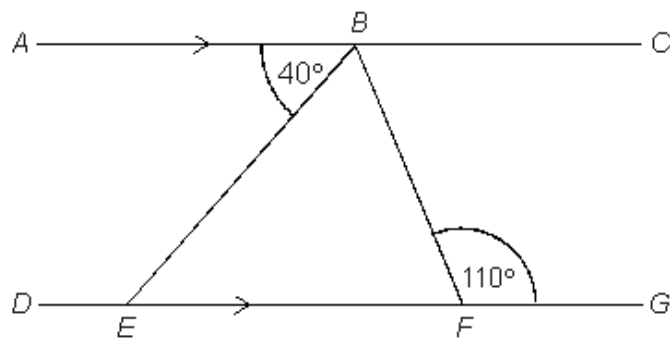
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(Total 2 marks)

Q11. AC and DG are parallel lines.

Angle $ABE = 40^\circ$

Angle $BFG = 110^\circ$



Not drawn accurately

- (a) Explain why angle BEF is 40°

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(1)

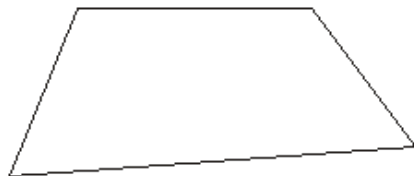
- (b) Show, giving reasons, that triangle BEF is isosceles.

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(3)

(Total 4 marks)

- Q12.** (a) Explain why the sum of the angles in any quadrilateral is 360° .

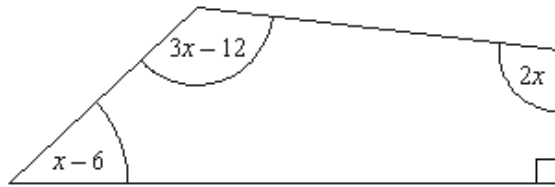


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(2)

- (b) A quadrilateral has one right angle.
The other angles are $2x$, $3x - 12$ and $x - 6$

Not drawn accurately



- (i) Write down an equation in terms of x .

Answer

(1)

- (ii) Solve your equation and find the size of the largest angle in the quadrilateral.

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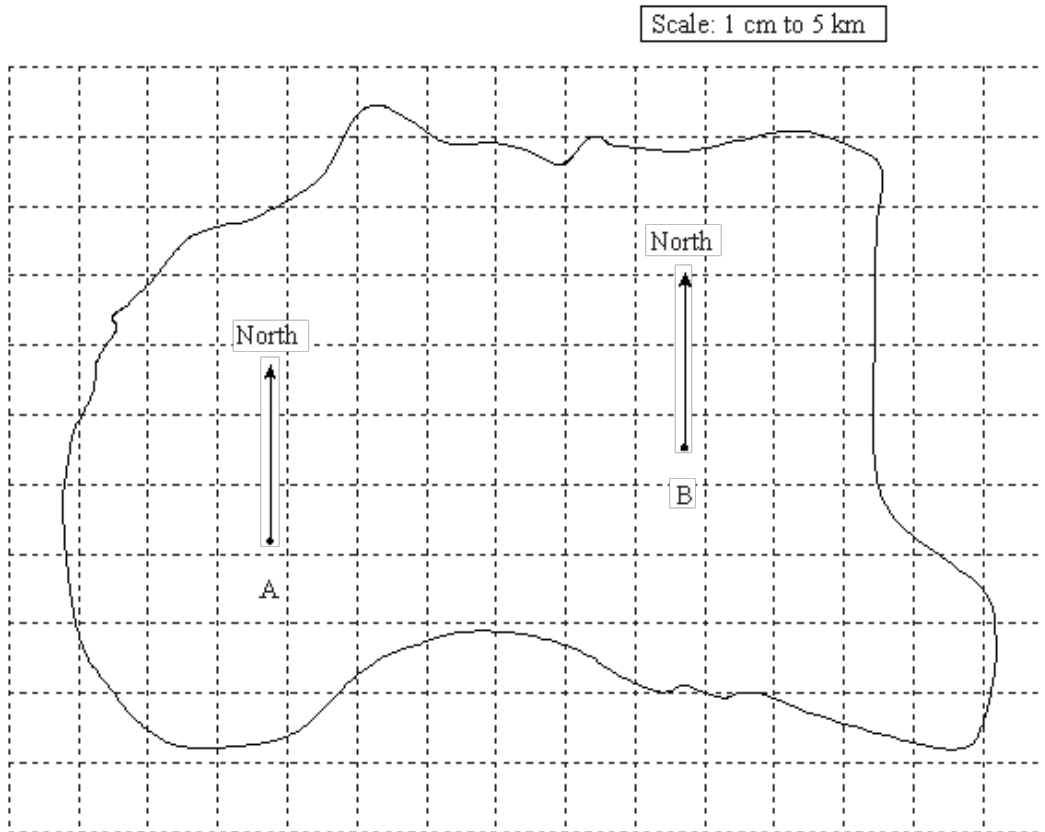
Answer $x =$ degrees

Largest angle = degrees

(3)

(Total 6 marks)

Q13. The diagram shows an island with North lines drawn at points A and B.



- (a) Treasure is buried on a bearing of 037° from A and 290° from B.
Mark, with a x, the position of the treasure.

(3)

- (b) Find the real distance between the points A and B.

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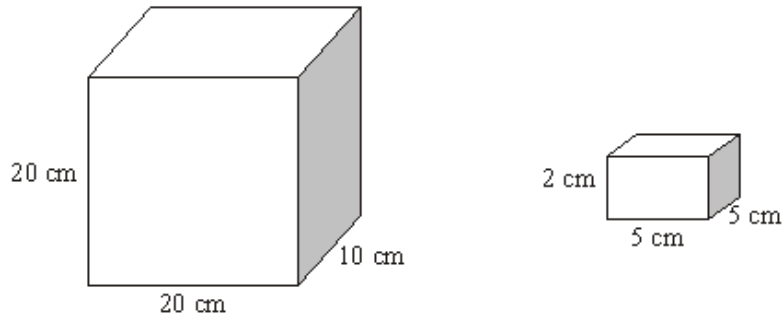
Answer km

(3)

(Total 6 marks)

- Q14.** The diagram shows two boxes that are cuboids.
 The larger box measures 20 cm by 10 cm by 20 cm.
 It is partly filled with 70 smaller boxes each measuring 5 cm by 5 cm by 2 cm.
 The smaller boxes are packed so that there are no gaps between them.

Not drawn accurately



How many more smaller boxes could be fitted in the larger box?

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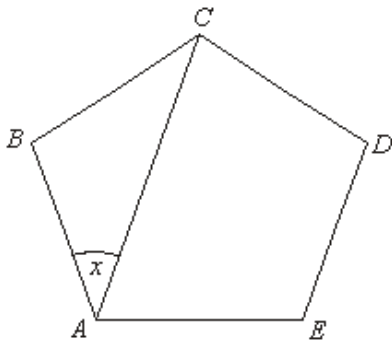
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Answer

(Total 4 marks)

- Q15.** $ABCDE$ is a regular pentagon.



Not drawn accurately

Work out the value of x .

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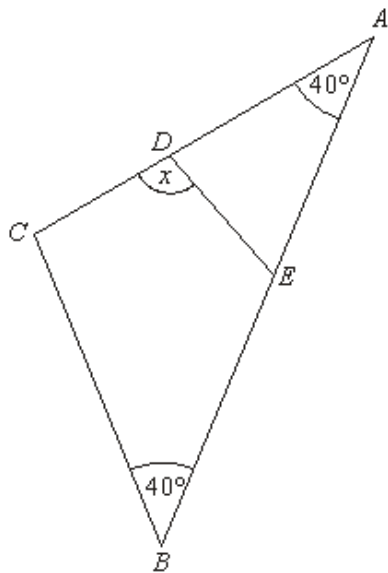
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Answer $x =$ degrees

(Total 4 marks)

Q16. ABC is an isosceles triangle. $BCDE$ is a kite.



Not drawn accurately

Work out the value of x .

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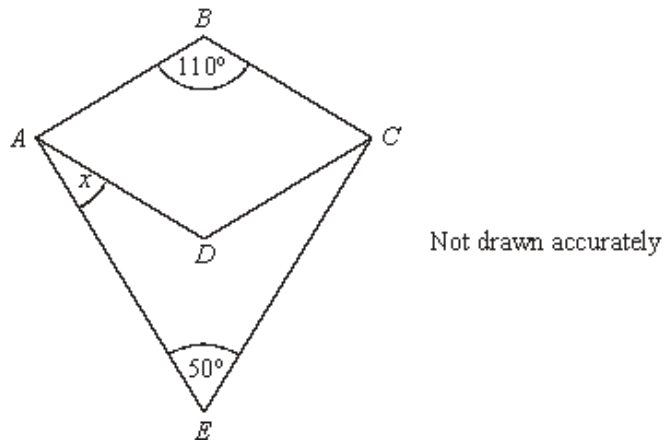
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Answer degrees

(Total 3 marks)

- Q17.** $ABCD$ is a rhombus and $ABCE$ is a kite.



Work out the value of x .

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Answer degrees

(Total 4 marks)

- Q18.** The sizes of the interior angles of a quadrilateral are in the ratio

$3 : 4 : 6 : 7$

Calculate the size of the largest angle.

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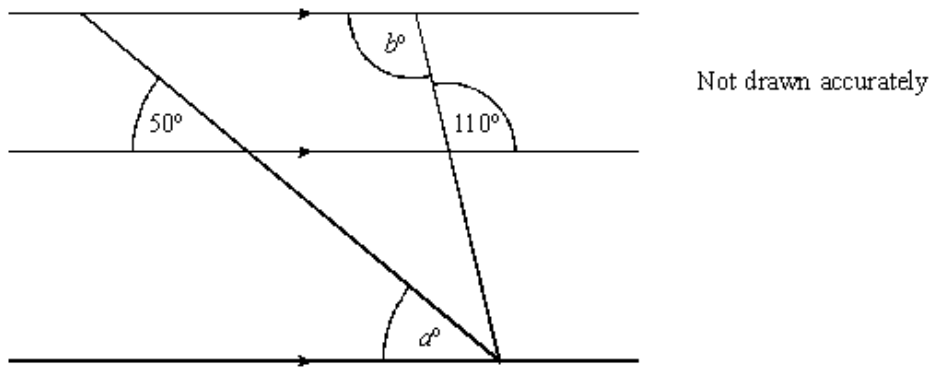
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Answer

(Total 3 marks)

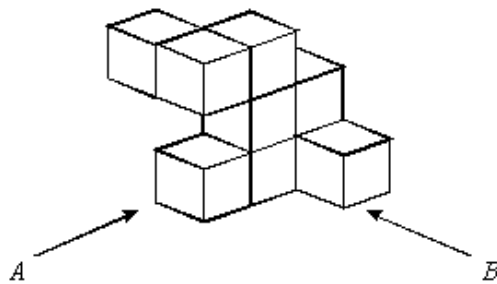
Q19. Write down the values of a and b .



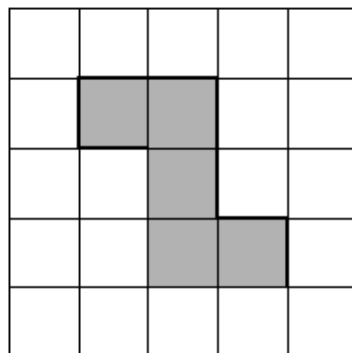
Answer $a = \dots\dots\dots$ degrees, $b = \dots\dots\dots$ degrees

(Total 2 marks)

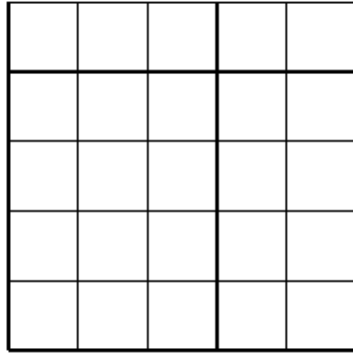
Q20. The diagram represents a solid made from 9 small cubes.



The view of the solid from direction A is shown below.



On the grid below, draw the view of the solid from direction *B*.



(Total 2 marks)

Q21. The diagram shows part of a regular polygon.

Each interior angle is 162° .



Calculate the number of sides of the polygon.

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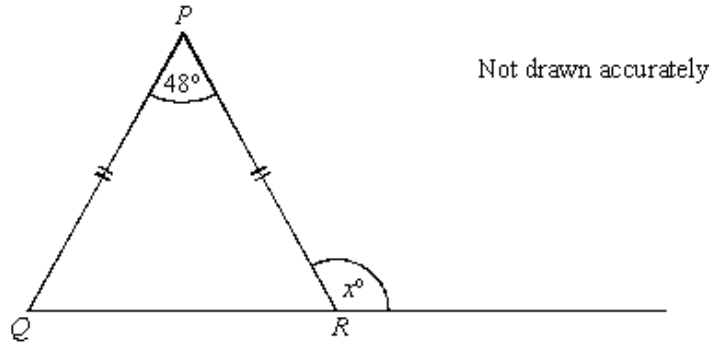
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Answer

(Total 3 marks)

- Q22.** (a) Triangle PQR is isosceles.
 $PQ = PR$.



Work out the value of x .

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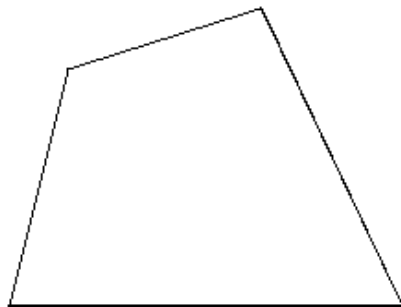
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Answer degrees

(3)

- (b) Explain why the sum of the interior angles of any quadrilateral is 360° .



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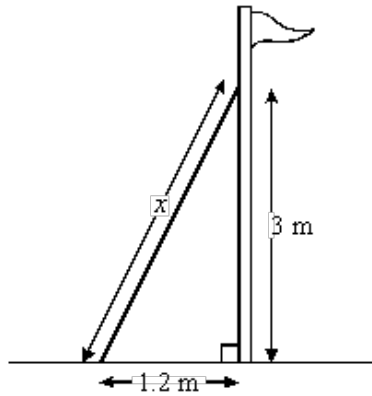
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(2)

(Total 5 marks)

- Q23.** A support for a flagpole is attached at a height of 3 m and is fixed to the ground at a distance of 1.2 m from the base.



Not to scale

Calculate the length of the support (marked x on the diagram).

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Answer m

(Total 3 marks)

