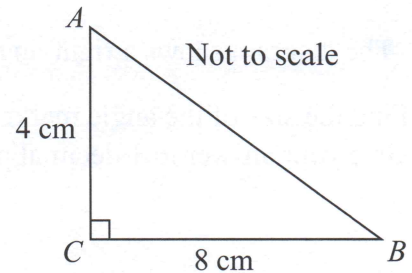


Pythagoras' Theorem

- 1 The diagram shows a right-angled triangle ABC . AC is 4 cm long. BC is 8 cm long.



Calculate the length of AB .
Give your answer to 2 decimal places.



..... cm
[Total 3 marks]

- 2 Point A has coordinates $(2, -1)$. Point B has coordinates $(8, 8)$.
Find the exact length of the line segment AB . Simplify your answer as much as possible.

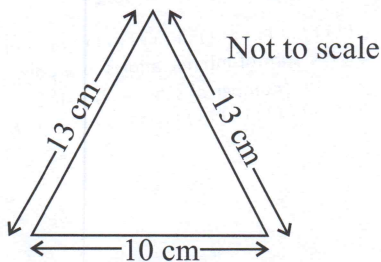


.....
[Total 3 marks]

- 3 A triangle has a base of 10 cm. Its other two sides are both 13 cm long.



Calculate the area of the triangle.

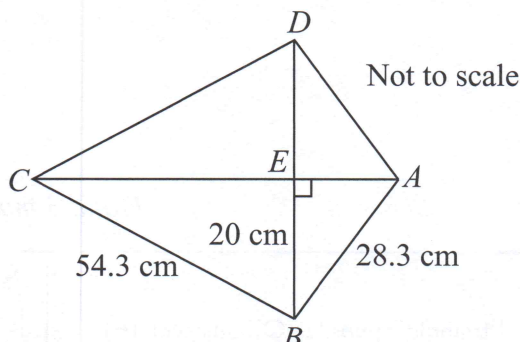


..... cm^2
[Total 4 marks]

- 4 The diagram shows a kite $ABCD$. AB is 28.3 cm long. BC is 54.3 cm long. BE is 20 cm in length.



Work out the perimeter of triangle ABC . Give your answer to 1 decimal place.



..... cm
[Total 5 marks]

Score:

15

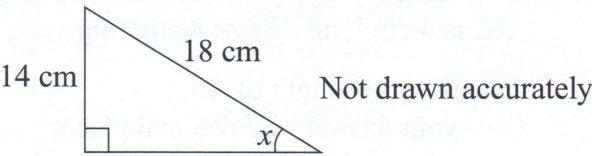


Trigonometry

- 1
- The diagram shows a right-angled triangle.
- 5

GRADE

Find the size of the angle marked x .
Give your answer to 1 decimal place.



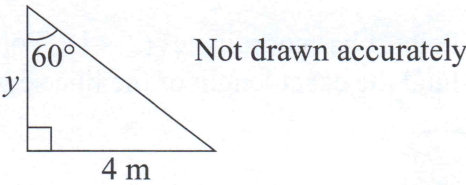
..... °
[Total 3 marks]

- 2
- The diagram shows a right-angled triangle.
- 5

GRADE



Find the exact length of the side marked y .



..... m
[Total 3 marks]

- 3
- A regular hexagon is drawn such that all of its vertices are on the circumference of a circle of radius 8.5 cm.
- 6

GRADE

Calculate the distance from the centre of the circle to the centre of one edge of the hexagon.
Give your answer to 2 decimal places.

The sum of interior angles in a polygon
= (number of sides - 2) × 180°

..... cm
[Total 5 marks]

- 4
- Show that $\tan 30^\circ + \sin 60^\circ = \frac{5\sqrt{3}}{6}$
- 7

GRADE



[Total 3 marks]

Exam Practice Tip

In an exam, it'll help if you start by labelling the sides of a right-angled triangle, opposite (O), adjacent (A) and hypotenuse (H). If you're working out an angle, make sure you check whether it's sensible — if you get an angle of 720° or 0.72°, it's probably wrong so give it another go.

Score

14

The Sine and Cosine Rules

- 1 In the triangle below, $AB = 10$ cm, $BC = 7$ cm and angle $ABC = 85^\circ$.

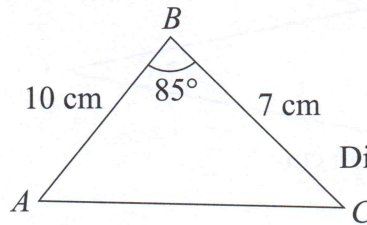


Diagram not accurately drawn

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

$$AC^2 = \dots\dots\dots^2 + \dots\dots\dots^2 - (2 \times \dots\dots\dots \times \dots\dots\dots \times \cos \dots\dots\dots^\circ)$$

$$AC = \sqrt{\dots\dots\dots - \dots\dots\dots \times \cos \dots\dots\dots^\circ}$$

$$AC = \dots\dots\dots$$

..... cm

[2]

- b) Calculate the area of triangle ABC .
Give your answer to 3 significant figures.

..... cm^2

[2]

[Total 4 marks]

- 2 In the triangle below, $AB = 12$ cm, $BC = 19$ cm and $AC = 14$ cm.

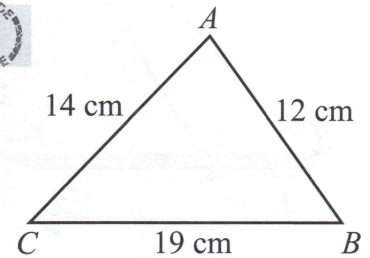


Diagram not accurately drawn

Calculate the area of the triangle.

..... cm^2

[Total 4 marks]

- 3 $ABCD$ is a trapezium.



BC is parallel to AD .

$BC = x$ cm.

$AD = 3x$ cm.

Angle $BAC = 30^\circ$.

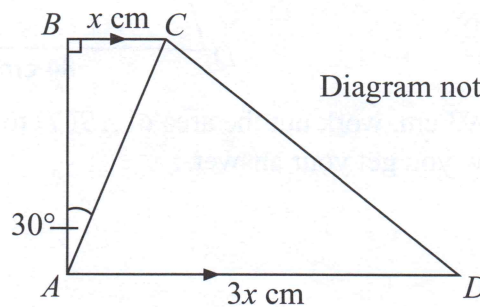


Diagram not accurately drawn

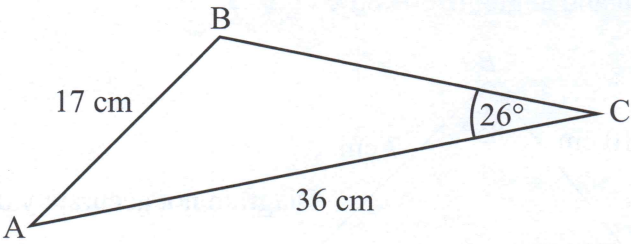
The perimeter of triangle ACD is $(a + \sqrt{b})x$ cm. Find the values of a and b .

$a = \dots\dots\dots$, $b = \dots\dots\dots$

[Total 5 marks]

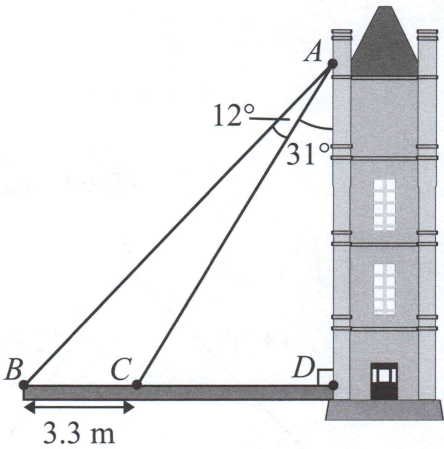
- 4
- In the triangle below, $AB = 17\text{ cm}$, $AC = 36\text{ cm}$ and angle $ACB = 26^\circ$. Angle ABC is obtuse.
- GRADE 7

Find the size of angle ABC . Give your answer to correct to 1 d.p.



.....
[Total 3 marks]

- 5
- A castle drawbridge is supported by two chains, AB and AC . Using the information on the diagram, calculate the total length of the drawbridge, BD , correct to 3 s.f.
- GRADE 8



..... m
[Total 5 marks]

- 6
- $ABCD$ is a quadrilateral.
- GRADE 8

$AB = 55\text{ cm}$.
 $DC = 84\text{ cm}$.
Angle $ABC = 116^\circ$.
Angle $BCD = 78^\circ$.

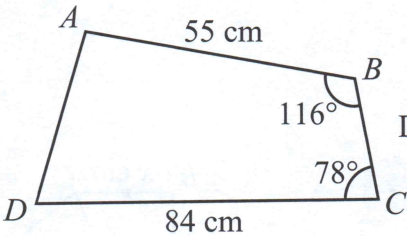


Diagram not accurately drawn


Given that $AC = 93\text{ cm}$, work out the area of $ABCD$ to 3 significant figures. Show clearly how you get your answer.

..... cm^2
[Total 6 marks]

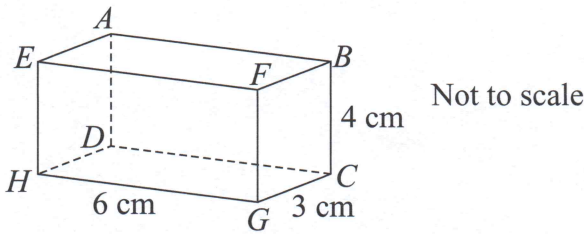
Score:

27

3D Pythagoras and Trigonometry

- 1 The diagram below is a cuboid $ABCDEFGH$. 

The cuboid has sides of length 6 cm, 4 cm and 3 cm.




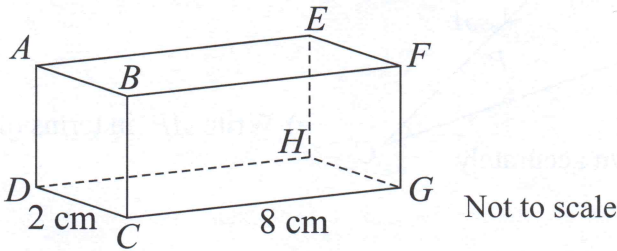
Calculate the length of the diagonal BH .
Give your answer to 3 significant figures.

$BH^2 = \dots\dots\dots^2 + \dots\dots\dots^2 + \dots\dots\dots^2$

$BH = \sqrt{\dots\dots\dots}$

$BH = \dots\dots\dots$ cm
[Total 3 marks]

- 2 The diagram below is a cuboid $ABCDEFGH$. It represents an empty box with a volume of 80 cm^3 and 2 edges measuring 2 cm and 8 cm. 



A straight stick is placed in the box and wedged between points F and D .
Find the size of the angle the stick makes with the plane $CDHG$.
Give your answer to 2 significant figures.

$\dots\dots\dots^\circ$
[Total 5 marks]

Score:

--

8

Vectors

- 1
- a, b and c are column vectors, where $\mathbf{a} = \begin{pmatrix} -3 \\ 5 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} 5 \\ 4 \end{pmatrix}$ and $\mathbf{c} = \begin{pmatrix} -4 \\ -6 \end{pmatrix}$**
- GRADE 5

Calculate:

a) $\mathbf{a} - \mathbf{b}$

.....
[1]

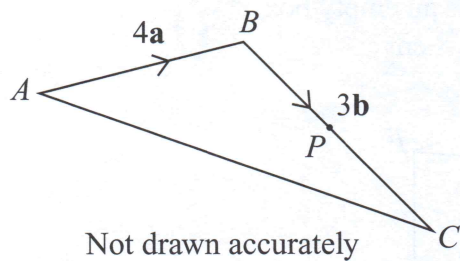
b) $4\mathbf{b} - \mathbf{c}$

.....
[1]

c) $2\mathbf{a} + \mathbf{b} + 3\mathbf{c}$

.....
[1]
[Total 3 marks]

- 2
- ABC is a triangle where $\overrightarrow{AB} = 4\mathbf{a}$ and $\overrightarrow{BC} = 3\mathbf{b}$. P is the midpoint of BC.**
- GRADE 6



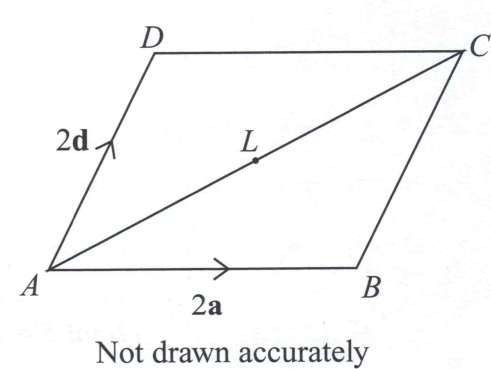
a) Write \overrightarrow{AC} in terms of **a** and **b**.

.....
[1]

b) Write \overrightarrow{AP} in terms of **a** and **b**.

.....
[1]
[Total 2 marks]

- 3
- ABCD is a parallelogram. $\overrightarrow{AB} = 2\mathbf{a}$ and $\overrightarrow{AD} = 2\mathbf{d}$. L is the midpoint of AC.**
- GRADE 6



Write in terms of **a** and **d**:

a) \overrightarrow{CD}

.....
[1]

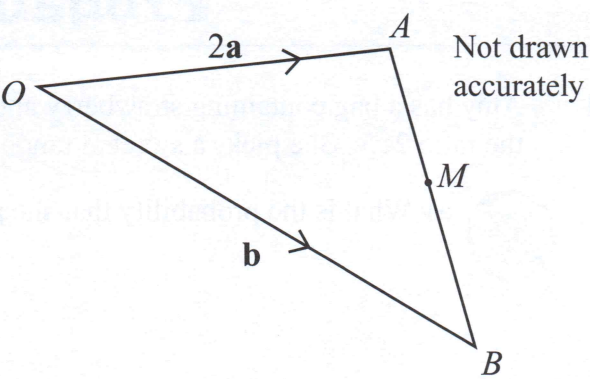
b) \overrightarrow{AC}

.....
[1]

c) \overrightarrow{BL}

.....
[1]
[Total 3 marks]

4 In the diagram, $\overrightarrow{OA} = 2\mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$.
 M is the midpoint of AB .



a) Find \overrightarrow{OM} in terms of \mathbf{a} and \mathbf{b} . 7

$\overrightarrow{OM} = \dots + \dots = \dots + \frac{1}{2} \dots$

$\overrightarrow{AB} = \dots + \dots$

$\overrightarrow{OM} = \dots + \frac{1}{2}(\dots) = \dots$

.....
[2]

X is a point on AB such that $AX:XB = 1:3$. 9

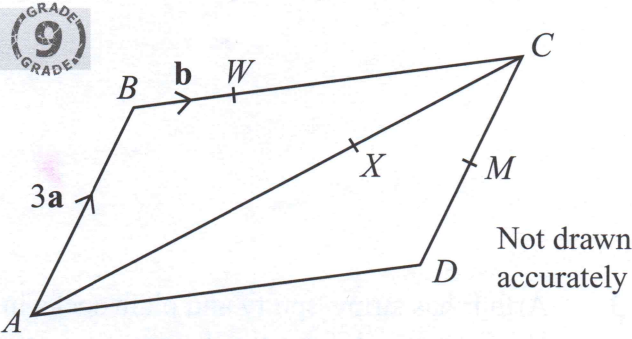
b) Find \overrightarrow{OX} in terms of \mathbf{a} and \mathbf{b} .

.....
[3]
[Total 5 marks]

5 $ABCD$ is a parallelogram. $\overrightarrow{AB} = 3\mathbf{a}$, and $\overrightarrow{BW} = \mathbf{b}$. 9

M is the midpoint of CD and $AX = 2XC$.
 $BW:WC = 1:5$

a) Find \overrightarrow{BX} in terms of \mathbf{a} and \mathbf{b} .



.....
[4]

b) Hence show that B , X and M are three points on a straight line.

.....
[4]
[Total 8 marks]

Score:
21