

Pythagoras and Trigonometry in 2D

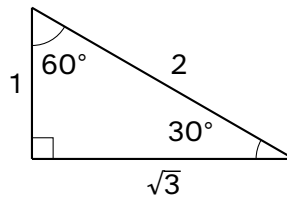
For AQA Level 2 Certificate in Further Mathematics (8365)

Name _____

Total marks: **26**

Answer **all** questions in the spaces provided. Show your working: marks are given for correct method. Do **not** use a calculator.

- 1 The diagram shows a right-angled triangle with sides 1, $\sqrt{3}$ and 2



Not drawn accurately

- (a) Circle the value of $\tan 30^\circ \div \sin 60^\circ$

[1 mark]

$\frac{1}{2}$

$\frac{2}{3}$

$\frac{\sqrt{3}}{3}$

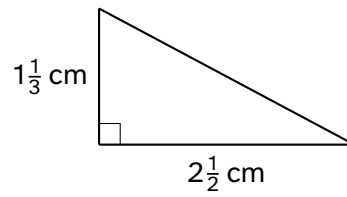
$\frac{3}{2}$

- (b) Work out the exact value of $6 \sin 60^\circ - 2 \tan 30^\circ$
Give your answer in the form $\frac{a\sqrt{3}}{b}$, where a and b are integers.

[2 marks]

Answer _____

- 2 Here is a right-angled triangle.



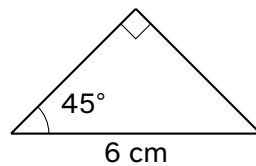
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Work out the length of the hypotenuse.
Give your answer as a mixed number.

[2 marks]

Answer _____ cm

- 3 Here is a right-angled triangle.



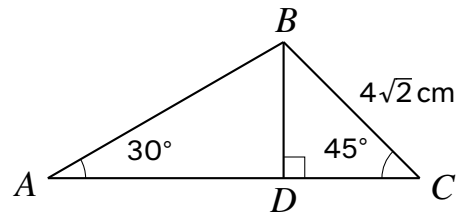
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Work out the area of the triangle.

[2 marks]

Answer _____ cm^2

- 4 In triangle ABC , BD is perpendicular to AC .



Not drawn accurately

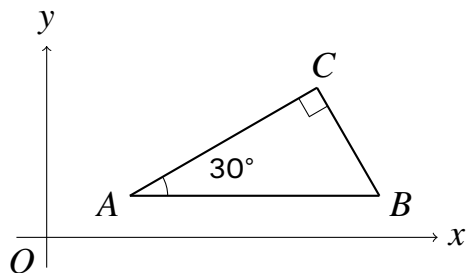
Work out the exact perimeter of triangle ABC .

Give your answer in the form $a + b\sqrt{2} + c\sqrt{3}$, where a , b and c are integers.

[4 marks]

Answer _____ cm

- 5 Triangle ABC has vertices $A(2, 1)$, $B(8, 1)$ and C .
Angle $ACB = 90^\circ$ and angle $CAB = 30^\circ$



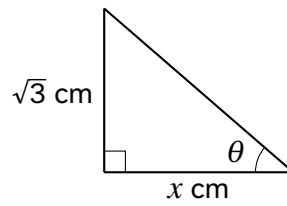
Not drawn accurately

Work out the exact coordinates of C .

[3 marks]

Answer (_____ , _____)

- 6 Here is a right-angled triangle.



Not drawn accurately

$$1 < x < 3$$

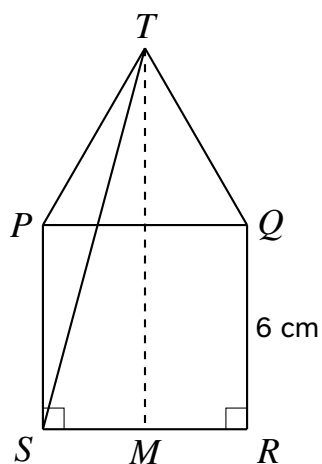
Work out the range of possible values of θ .

You must show your working.

[3 marks]

Answer _____

- 7 The diagram shows a pentagon made from a square $PQRS$ and an equilateral triangle PQT .
The square has side length 6 cm.
 M is the midpoint of SR .



Not drawn accurately

- (a) Show that $TM = (6 + 3\sqrt{3})$ cm

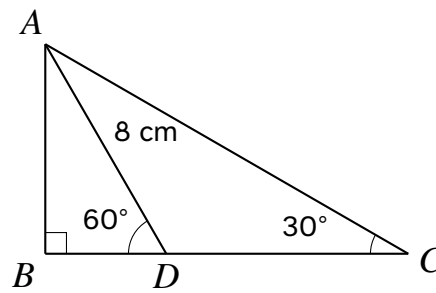
[2 marks]

- (b) Work out ST^2
Give your answer in the form $a + b\sqrt{3}$, where a and b are integers.

[3 marks]

$$ST^2 = \underline{\hspace{2cm}}$$

- 8 ABC is a right-angled triangle.
 D is a point on BC .



Not drawn accurately

Work out the exact area of triangle ADC .
Give your answer in the form $a\sqrt{3}$, where a is an integer.

[4 marks]

Answer _____ cm^2