

AQA IGCSE FM "Full Coverage": Trig in 2D and 3D

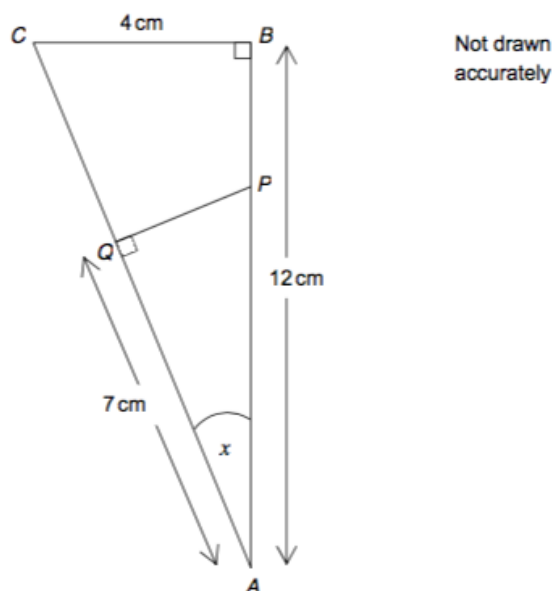
This worksheet is designed to cover one question of each type seen in past papers, for each AQA IGCSE Further Maths topic. This worksheet was automatically generated by the DrFrostMaths Homework Platform: students can practice this set of questions interactively by going to www.drfrostmaths.com/homework, logging on, *Practise* → *Past Papers/Worksheets* (or *Library* → *Past/Past Papers* for teachers), and using the 'Revision' tab.

Question 1

Categorisation: Use trigonometry of right-angled triangles to find values or expressions for $\sin x$, $\cos x$, $\tan x$.

[AQA IGCSE FM Practice paper set 2 P1 Q5a]

The diagram shows two right-angled triangles ABC and APQ.



Using triangle ABC, write down the value of $\tan x$.

$\tan x = \dots\dots\dots$

Question 2

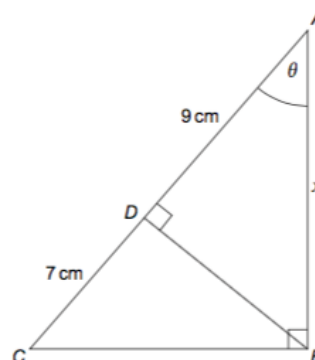
Categorisation: For embedded right-angled triangles, recognise that trigonometric ratios can sometimes be written in two different ways, depending on the triangle used.

[AQA IGCSE FM Jan2013-P1 Q3b]

ABC is a right-angled triangle. D is a point on AC. BD is perpendicular to AC.

It can be shown that $\cos \theta = \frac{x}{16}$

By writing another expression for $\cos \theta$ in terms of x , or otherwise, work out the value of x .



Not drawn accurately

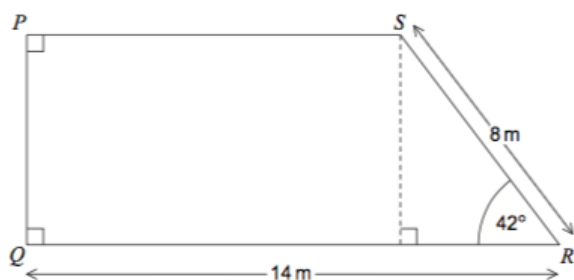
$x = \dots\dots\dots$ cm

Question 3

Categorisation: Use trigonometry of right-angled triangles in general geometric problem solving.

[AQA IGCSE FM June2013-P2 Q9]

PQRS is a trapezium.



Not drawn accurately

Work out the perimeter of PQRS.

$\dots\dots\dots$ m

Question 4

Categorisation: Determine the area of a triangle given its 3 sides.

[AQA IGCSE FM SAM P2 Q15]

A triangle has sides 10.2 cm, 6.8 cm and 5.7 cm. Work out the area of the triangle.

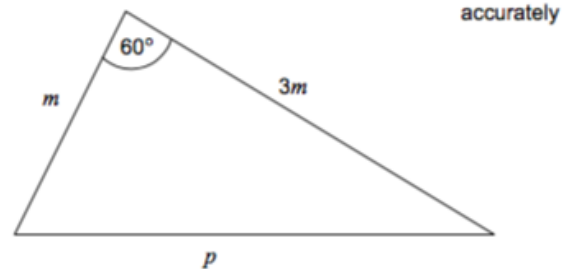
..... cm^2

Question 5

Categorisation: Use the cosine rule to relate geometric lengths.

[AQA IGCSE FM Practice paper set 4 P1 Q11 Edited]

Use the cosine rule to express p in terms of m .



$p = \dots\dots\dots$

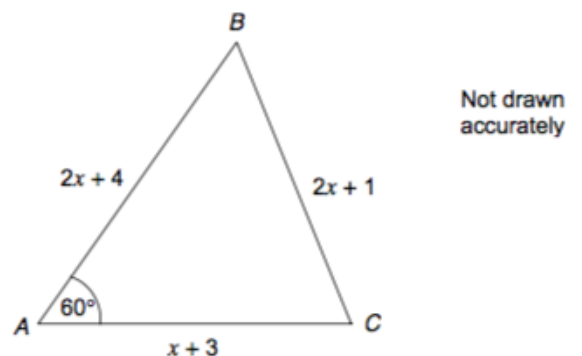
Question 6

Categorisation: Use the cosine rule to determine the value of a variable.

[AQA IGCSE FM Practice paper set 1 P1 Q15b Edited]

In triangle ABC, angle BAC = 60°

Use the cosine rule to find the exact value of x .



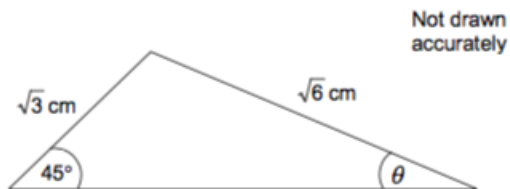
.....

Question 7

Categorisation: Use the sine rule.

[AQA IGCSE FM Practice paper set 2 P1 Q11b]

Here is a triangle.



Work out the value of θ .

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

Question 8

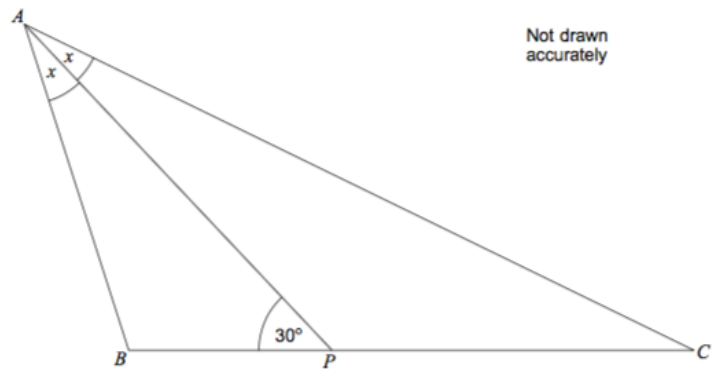
Categorisation: Write geometric proofs involving the sine rule.

[AQA IGCSE FM June2013-P2 Q23 Edited]

In triangle ABC, AP bisects angle BAC.

Use the sine rule in triangles ABP and ACP to

prove that $\frac{AB}{AC} = \frac{BP}{PC}$



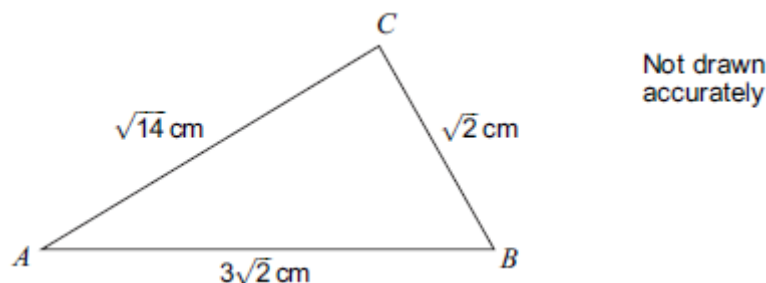
$$? = \dots\dots\dots$$

Question 9

Categorisation: Determine the area of a triangle when the side lengths are surds.

[AQA IGCSE FM June 2014-P1 Q11b Edited]

Here is triangle ABC.



It can be shown that angle $B = 60^\circ$.

Hence work out the area of triangle ABC.

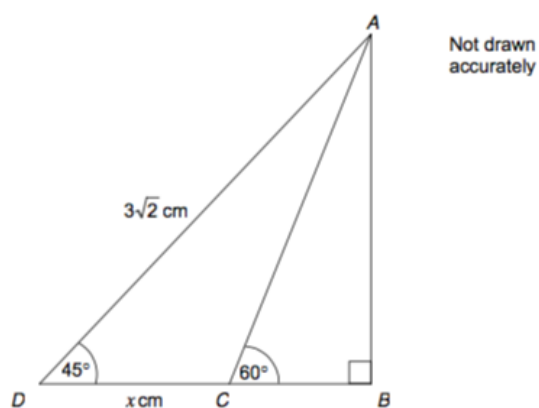
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Question 10

Categorisation: Know exact trigonometric ratios, e.g. $\sin 30^\circ = \frac{1}{2}$ and $\tan 60^\circ = \sqrt{3}$

[AQA IGCSE FM SAM P1 Q14]

In the diagram, DCB is a straight line.



Work out the length of DC, marked x on the diagram.

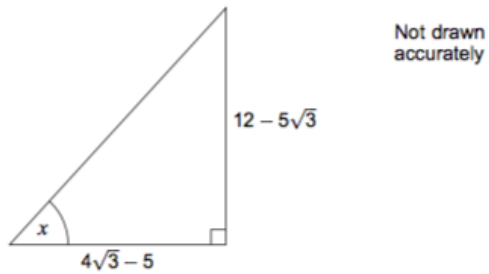
Write your answer in the form $a - \sqrt{b}$

$DC =$

Question 11

Categorisation: Determine a trigonometric ratio involving surd lengths.

[AQA IGCSE FM Jan2013-P1 Q15 Edited]



Find the value of x .

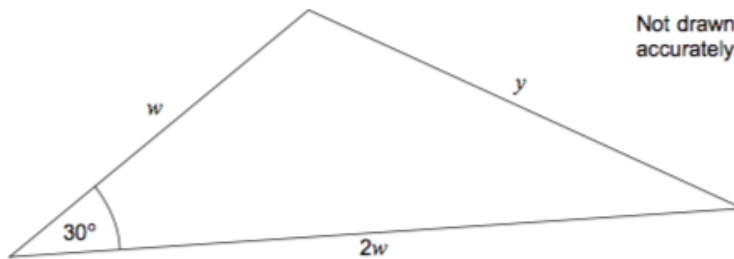
$x = \dots\dots\dots^\circ$

Question 12

Categorisation: Use algebra sides in the area of a triangle formula.

[AQA IGCSE FM Jan2013-P2 Q20]

The area of this triangle is 18 cm^2 .



Work out y .

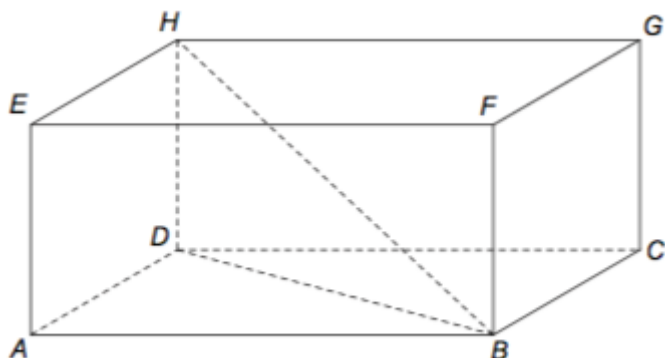
$y = \dots\dots\dots$

Question 13

Categorisation: Work out the angle between a line and a plane in a 3D diagram.

[AQA IGCSE FM June2015-P2 Q17b]

ABCDEFGH is a cuboid.



$HB = 34 \text{ cm}$ $HD = 16 \text{ cm}$ $AD = 18 \text{ cm}$

Work out the angle between HB and ABCD.

..... °

Question 14

Categorisation: As above.

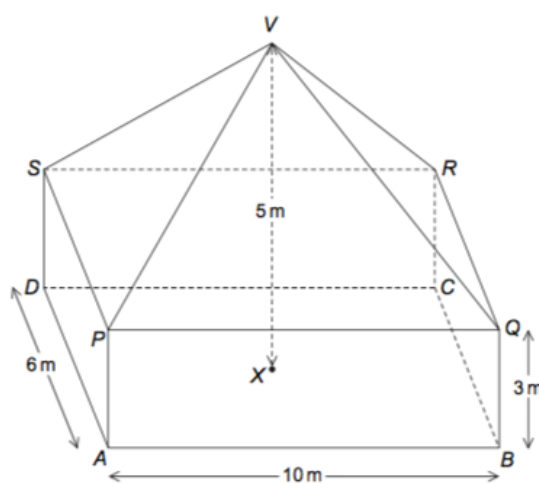
[AQA IGCSE FM Jan2013-P2 Q23a]

The diagram shows a cuboid ABCDPQRS and a pyramid PQRSV.

V is directly above the centre, X, of ABCD.

The total height, VX, is 5 metres.

Work out the angle between the line VA and the plane ABCD.



..... °

Question 15

Categorisation: As above.

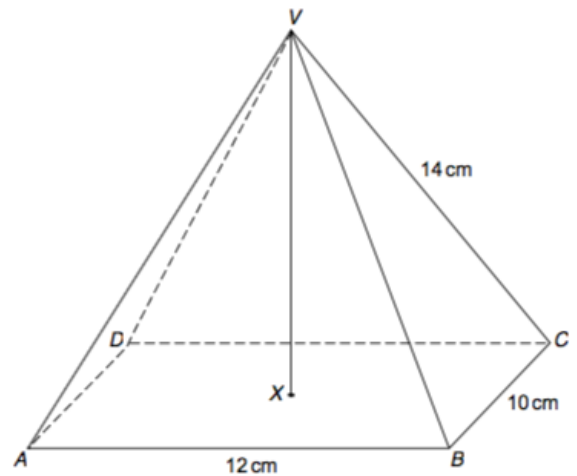
[AQA IGCSE FM SAM P2 Q17b Edited]

VABCD is a rectangular based pyramid.

AB = 12 cm, BC = 10 cm and VC = 14 cm

The base ABCD is horizontal and the vertex V is directly above X, the centre of the base.

Calculate the angle between VC and the plane ABCD.



..... °

Question 16

Categorisation: Determine the angle between two planes.

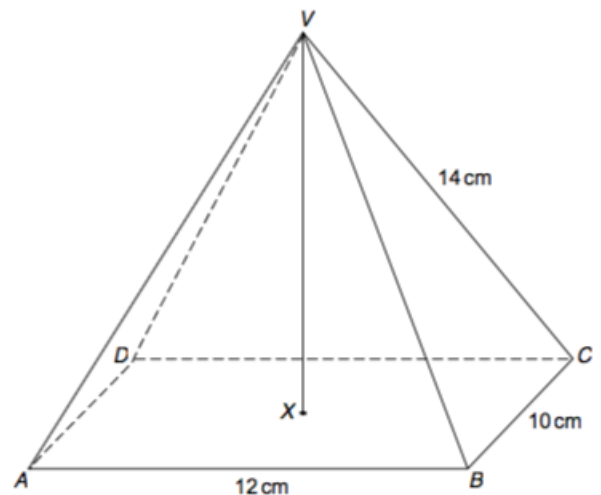
[AQA IGCSE FM SAM P2 Q17c Edited]

VABCD is a rectangular based pyramid.

AB = 12 cm, BC = 10 cm and VC = 14 cm

The base ABCD is horizontal and the vertex V is directly above X, the centre of the base.

Calculate the angle between the planes VBC and ABCD.



..... °

Question 17

Categorisation: As above.

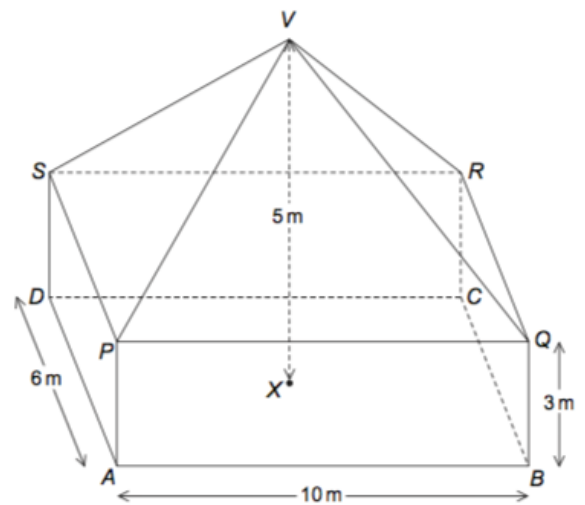
[AQA IGCSE FM Jan2013-P2 Q23b]

The diagram shows a cuboid ABCDPQRS and a pyramid PQRSV.

V is directly above the centre, X, of ABCD.

The total height, VX, is 5 metres.

Work out the angle between the planes VQR and PQRS.



..... °

Question 18

Categorisation: As above.

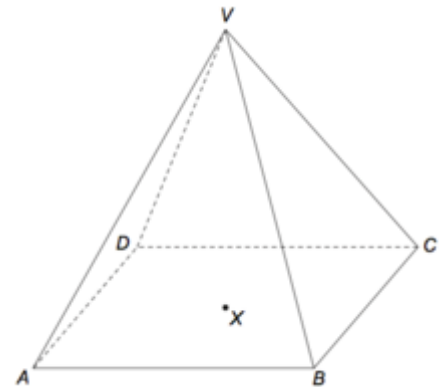
[AQA IGCSE FM June2016-P2 Q22]

Pyramid VABCD has a horizontal rectangular base.

X is the centre of the base. V is vertically above X.

$VB = VC = 17 \text{ cm}$ $AB = 22 \text{ cm}$ $BC = 16 \text{ cm}$

Work out the angle between the planes VBC and ABCD.



..... °

Question 19

Categorisation: Determine a bearing from a 3D diagram using trigonometry.

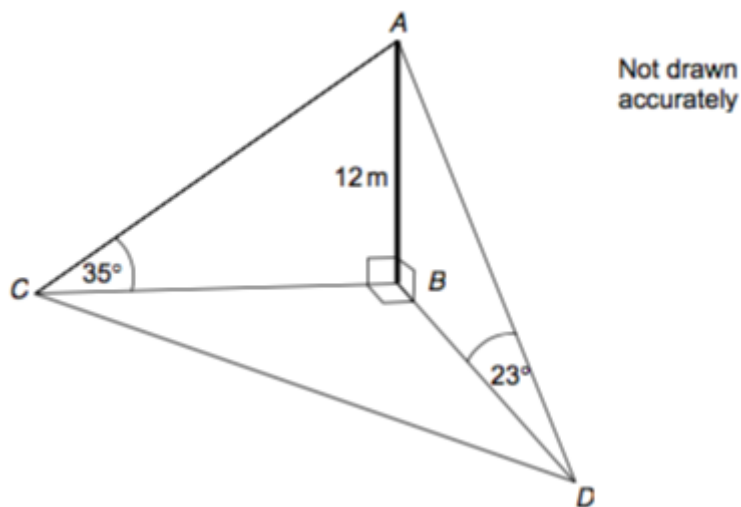
[AQA IGCSE FM Practice paper set 1 P2 Q7b]

The diagram shows a vertical mast, AB, 12 metres high.

Points B, C and D are on a horizontal plane.

Point C is due West of B. The angle of elevation of A from C is 35° .

Point D is due South of B. The angle of elevation of A from D is 23° .



Calculate the bearing of D from C.

Give your answer to the nearest degree.

.....°

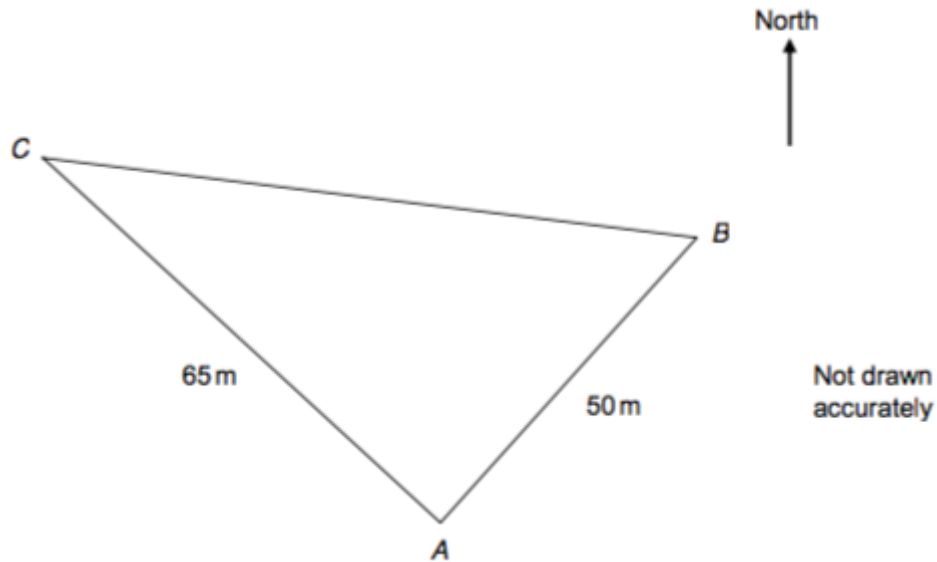
Question 20

Categorisation: Determine a bearing from a 2D diagram using trigonometry.

[AQA IGCSE FM Practice paper set 3 P2 Q9b Edited]

B is 50 metres from A on a bearing of 040° .

C is 65 metres from A on a bearing of 325° .



Angle CAB is equal to 75°

Work out the distance BC.

..... m

Answers

Question 1

$$\tan x = \frac{1}{3}$$

Question 2

$$x = 12 \text{ cm}$$

Question 3

any value in the range 35.4 m to 35.5 m

Question 4

$$18.3 \text{ cm}^2$$

Question 5

$$p = m\sqrt{7}$$

Question 6

$$x = 4 + 2\sqrt{7}$$

Question 7

$$\theta = 30^\circ$$

Question 8

$$\begin{aligned}\frac{\sin x}{BP} &= \frac{\sin 30}{AB} \rightarrow \sin x = \frac{\frac{1}{2}BP}{AB} \\ \frac{\sin x}{PC} &= \frac{\sin 150}{AC} \rightarrow \sin x = \frac{\frac{1}{2}PC}{AC} \\ \therefore \frac{\frac{1}{2}BP}{AB} &= \frac{\frac{1}{2}PC}{AC} \\ \frac{1}{2}BP \times AC &= \frac{1}{2}PC \times AB \\ BP \times AC &= PC \times AB \\ \frac{AB}{AC} &= \frac{BP}{PC}\end{aligned}$$

Question 9

$$\frac{3\sqrt{3}}{2}$$

Question 10

$$DC = 3 - \sqrt{3}$$

Question 11

$$x = 60^\circ$$

Question 12

$$y = 7.4$$

Question 13

$$28.1^\circ$$

Question 14

any value in the range 40.5° to 40.8°

Question 15

$$56.1^\circ$$

Question 16

$$62.7^\circ$$

Question 17

$$21.8^\circ$$

Question 18

$$42.8^\circ$$

Question 19

$$149^\circ$$

Question 20

$$71 \text{ m}$$