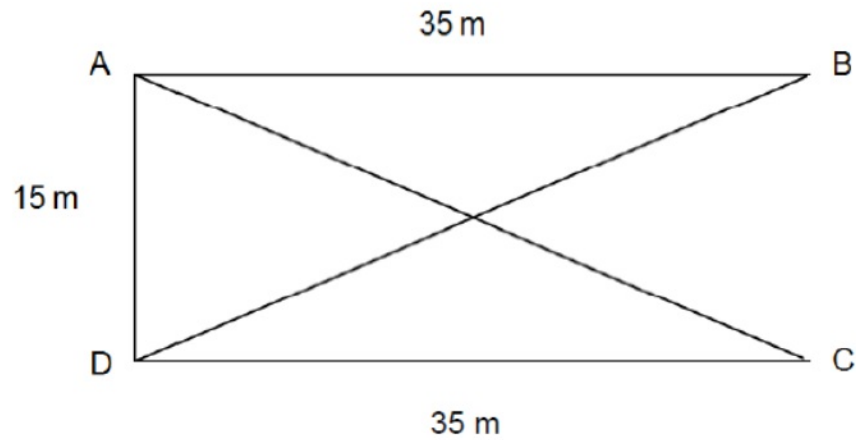


G43/44/45 Pythagoras

OCR

13 The diagram below shows five paths.

ADC and DAB are right-angled triangles.



Not to scale

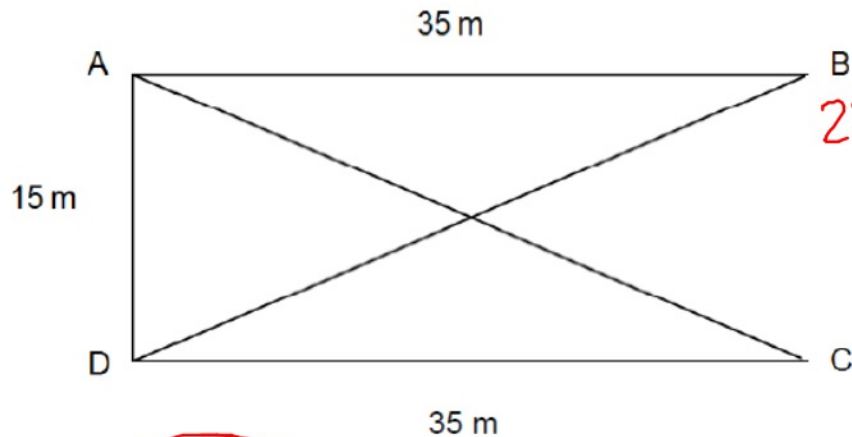
It costs £2.50 per metre to clean these paths.

Find the total cost of cleaning all five paths.

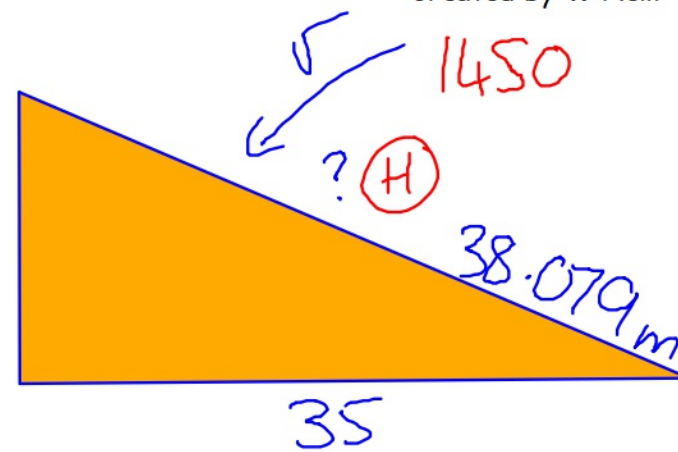
£..... [6]

13 The diagram below shows five paths.

ADC and DAB are right-angled triangles.



225 15



Not to scale

1225

It costs £2.50 per metre to clean these paths.

Find the total cost of cleaning all five paths.

Total Path Length

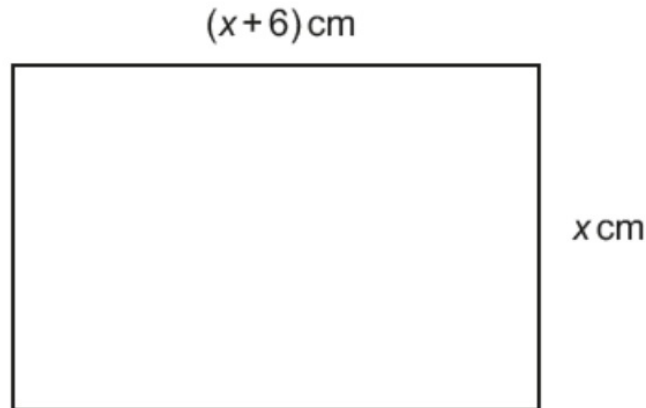
$$= 35 + 15 + 35 + 38.079 + 38.079$$

$$= 161.16 \text{ m} \times £2.50$$

=

$$£402.89 \text{ [6]}$$

16 A rectangle has length $(x + 6)$ cm and width x cm.



Not to scale

The perimeter of the rectangle is 40 cm.

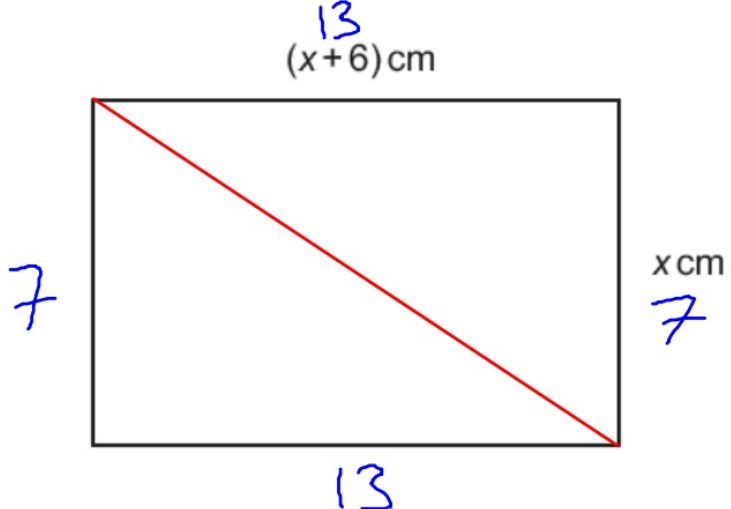
(a) Show that $x = 7$.

[3]

(b) Calculate the length of the diagonal of the rectangle.

..... cm [4]

16 A rectangle has length $(x + 6)$ cm and width x cm.

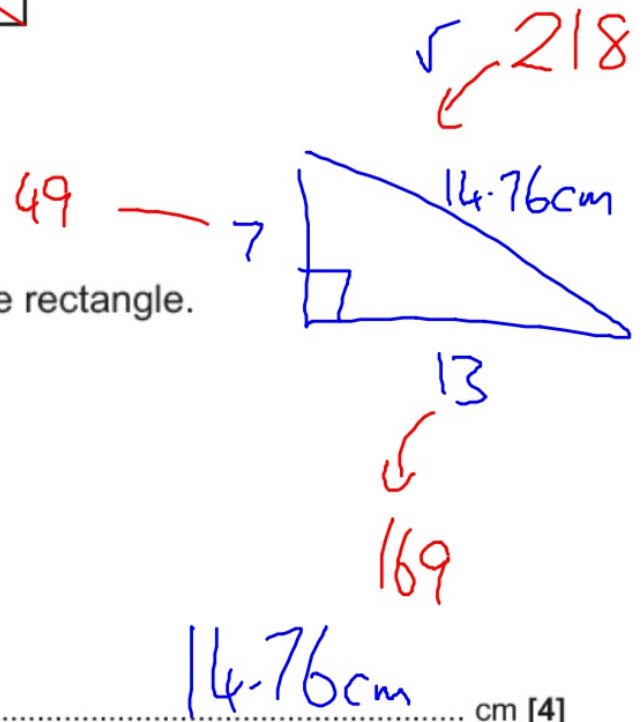


Not to scale

$x = 7$

The perimeter of the rectangle is 40 cm.

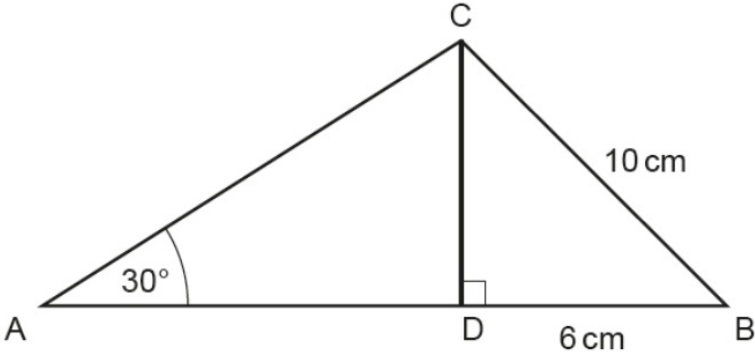
- (a) Show that $x = 7$.
- (b) Calculate the length of the diagonal of the rectangle.



[3]

..... 14.76 cm [4]

- 22 The diagram shows triangle ABC.
D is a point on AB such that $DB = 6\text{ cm}$.
 $BC = 10\text{ cm}$, angle $CAD = 30^\circ$ and angle $BDC = 90^\circ$.



Not to scale

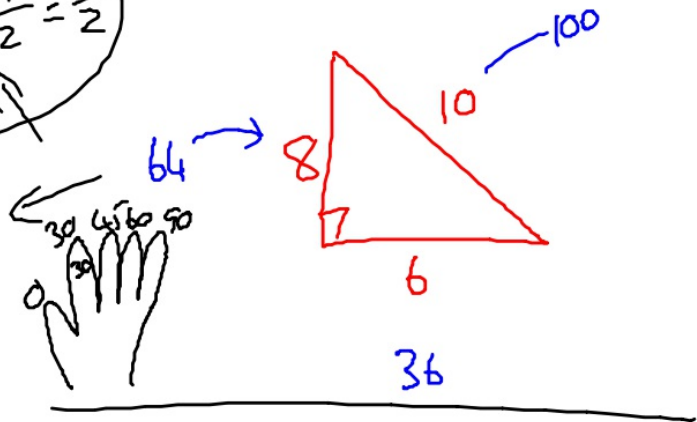
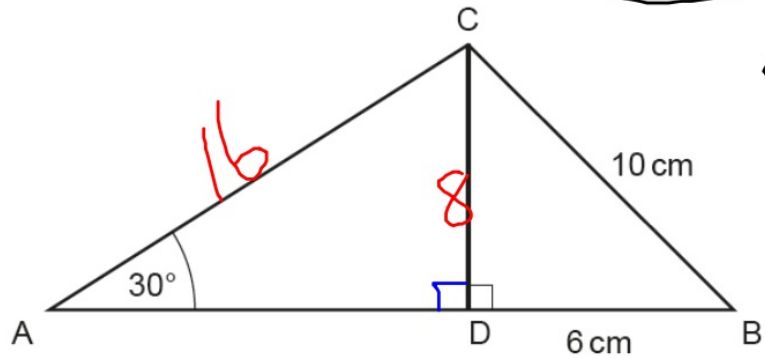
Work out the ratio length of AC : length of DB in its simplest form.

..... : [5]

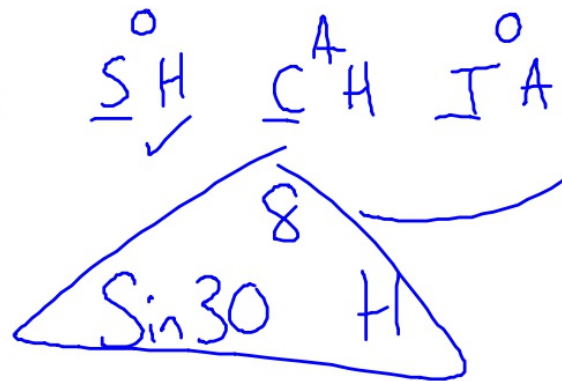
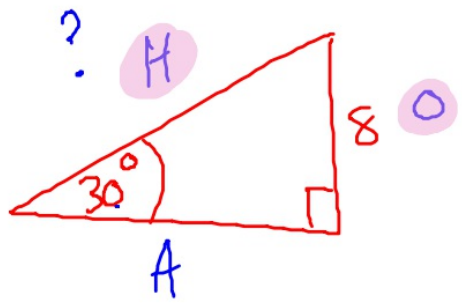
Created by W Neill

22 The diagram shows triangle ABC.
D is a point on AB such that DB = 6 cm.
BC = 10 cm, angle CAD = 30° and angle BDC = 90°.

$\sin 30 \frac{\sqrt{1}}{2} = \frac{1}{2}$



Work out the ratio length of AC : length of DB in its simplest form.



$H = \frac{8}{\sin 30}$

$H = \frac{8}{0.5} = \frac{16}{1}$

$H = 16$

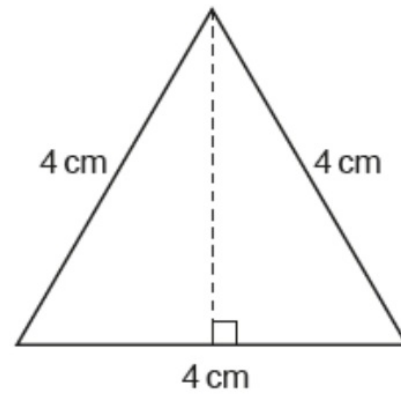
$16 : 6$
 $8 : 3$

$8 : 3$

[5]

11 The diagram shows an equilateral triangle.

Created by W Neill



Not to scale

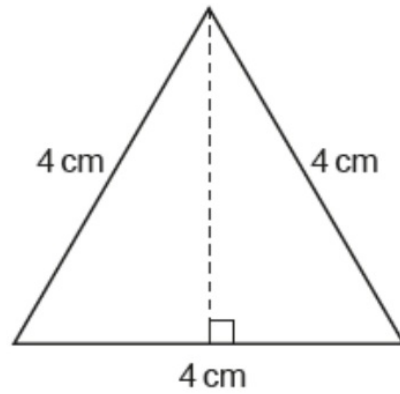
(a) (i) Show that the height of the equilateral triangle is 3.46 cm, correct to 3 significant figures. [3]

(ii) Find the area of the equilateral triangle.

(a)(ii) cm² [2]

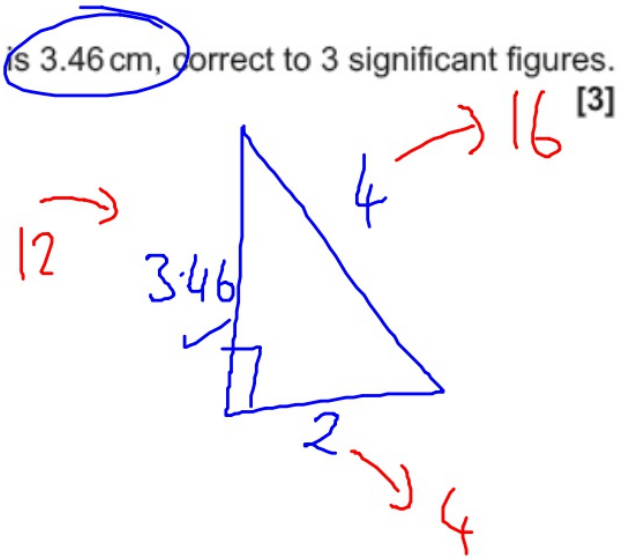
11 The diagram shows an equilateral triangle.

Created by W Neill



Not to scale

(a) (i) Show that the height of the equilateral triangle is 3.46 cm, correct to 3 significant figures.



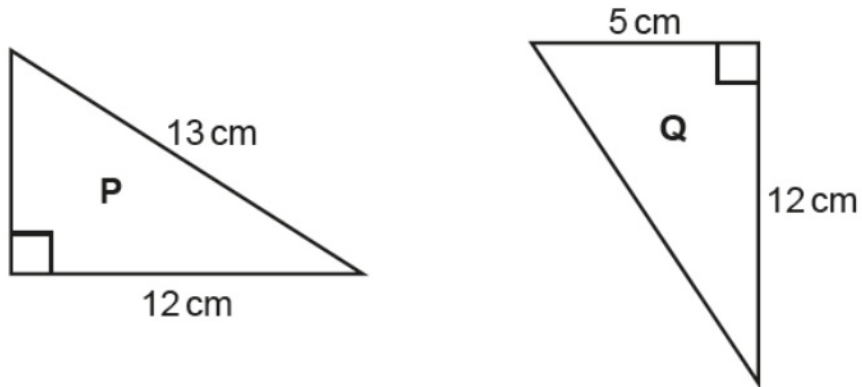
(ii) Find the area of the equilateral triangle.

$$\frac{B \times H}{2} = \frac{4 \times 3.46}{2} = 6.92 \checkmark$$

(a)(ii) cm² [2]

21 Triangles **P** and **Q** are right-angled.

Video created by W Neill



Not to scale

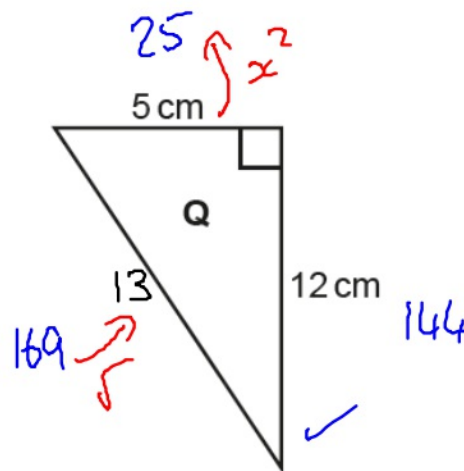
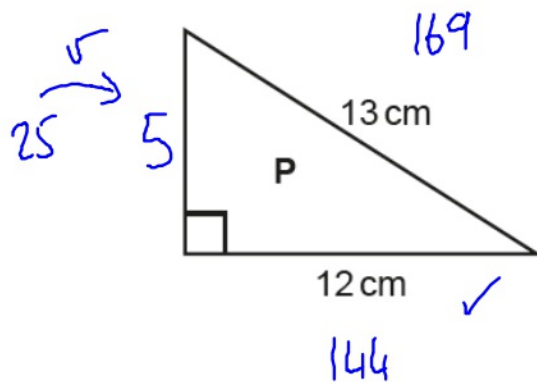
(a) Show that the two shorter sides in triangle **P** have the same lengths as the two shorter sides in triangle **Q**. [3]

(b) Explain why the two triangles are congruent.

.....
..... [1]

21 Triangles **P** and **Q** are right-angled.

Video created by W Neill



Not to scale

- (a) Show that the two shorter sides in triangle **P** have the same lengths as the two shorter sides in triangle **Q**. [3]

identical

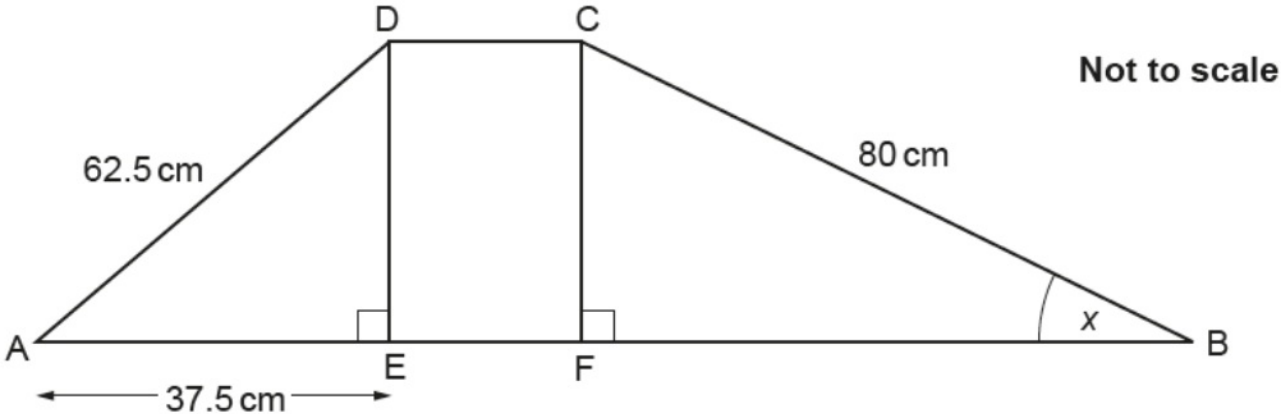
- (b) Explain why the two triangles are congruent.

..... If they have 3 sides equal they must be congruent.

..... [1]

19 In the diagram below, ABCD is a trapezium.
Length AE is 37.5 cm.
DE = CF

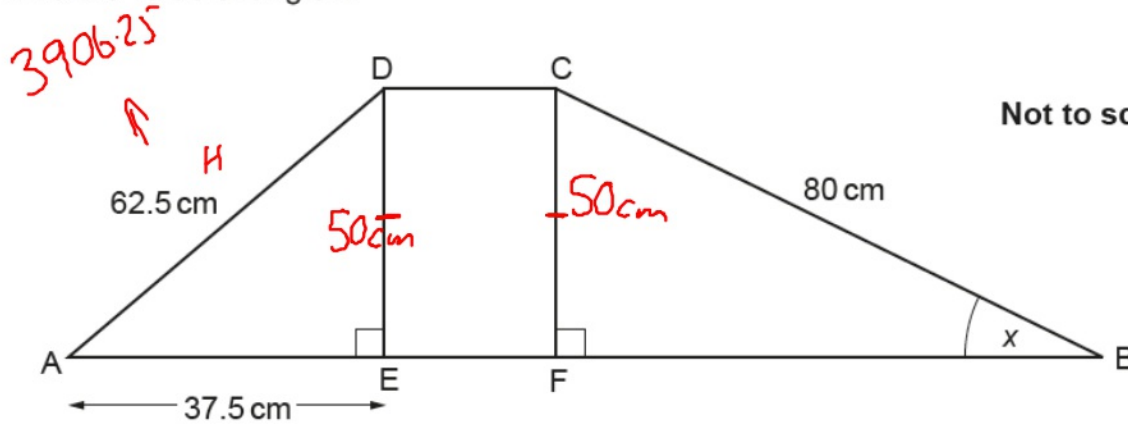
Find the value of angle x.



$x = \dots\dots\dots^\circ$ [6]

19 In the diagram below, ABCD is a trapezium.
 Length AE is 37.5 cm.
 DE = CF

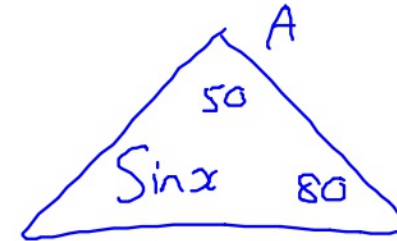
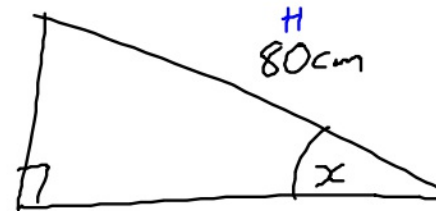
Find the value of angle x.



Created by W Neill

$\sin^{-1} \frac{50}{80}$ $\sin^{-1} \frac{5}{8}$ $\sin^{-1} \frac{50}{80}$

Not to scale \circ
 50cm



$$\sin x = 0.625$$

$$x = \sin^{-1} 0.625$$

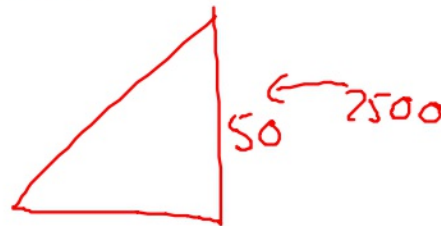
$$38.7^\circ$$

x = $^\circ$ [6]

3906.25

↓
 1406.25

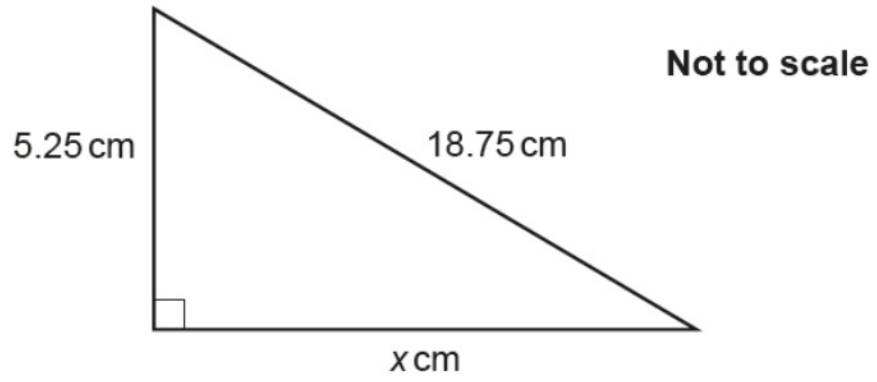
3906.25



1406.25

16 Here is a right-angled triangle.

G43



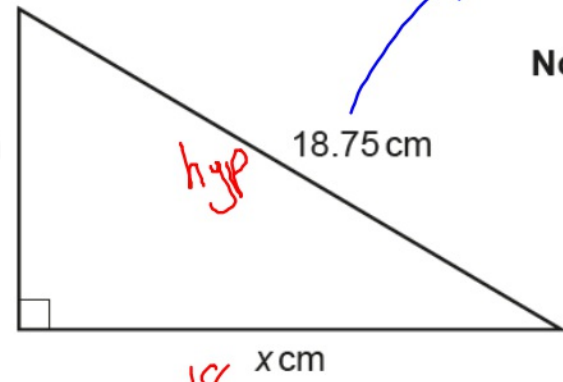
Work out the value of x .

$x = \dots\dots\dots$ [3]

16 Here is a right-angled triangle.

G43

27.5625 ←



351.5625

Not to scale

hyp - shorter side

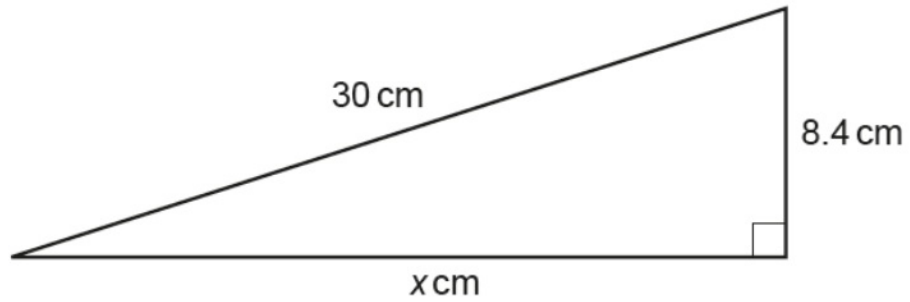
Work out the value of x.

18
↑
324

x = 18 [3]

20 Here is a right-angled triangle.

G43



Not to scale

Work out the value of x .

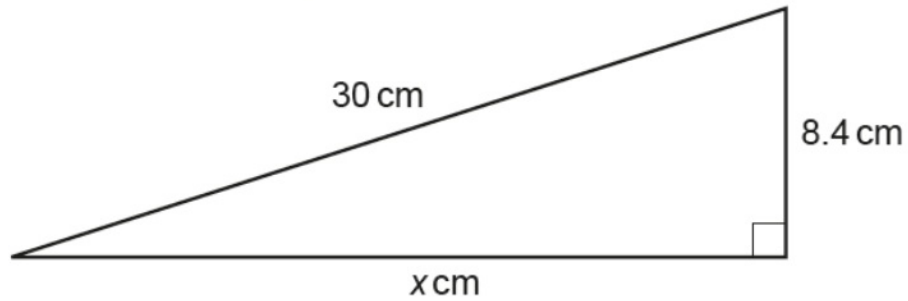
$x = \dots\dots\dots [3]$

20 Here is a right-angled triangle.

G43

900

Not to scale



70.56

Work out the value of x .



829.44

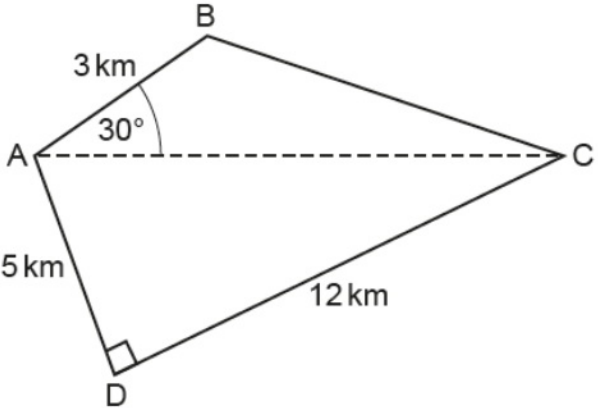
$$900 - 70.56$$

=

28.8 cm ✓

$x = \dots\dots\dots [3]$

20 The diagram shows some land in the shape of a quadrilateral, ABCD.



Not to scale

AB = 3 km, AD = 5 km, CD = 12 km and angle BAC = 30°.

The land is sold for £10 million per square kilometre.

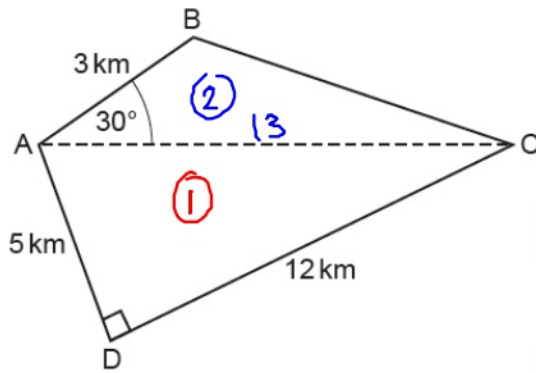
Calculate the total cost of the land.

£ million [7]

20 The diagram shows some land in the shape of a quadrilateral, ABCD.

Video created by W Neill

G43
G48
G59



Not to scale

$$\textcircled{1} \frac{B \times H}{2} = \frac{12 \times 5}{2} = \frac{60}{2} = 30 \text{ km}^2$$

$$\textcircled{2} \frac{1}{2} ab \sin C$$

$$\begin{aligned} AC^2 &= 12^2 + 5^2 \\ &= 144 + 25 \\ &= 169 \end{aligned}$$

$$AC = \sqrt{169} = 13$$

Area

$$\frac{1}{2} ab \sin C$$



$$\frac{1}{2} (3)(13) \sin 30^\circ$$

$$\frac{1}{2} (3)(13) \left(\frac{1}{2}\right)$$

$$13 \times 3 = 39$$

$$\div 2 = 19.5$$

$$\div 2 = 9.75 \text{ km}^2$$

$$\text{Total} = 39.75 \text{ km}^2 \times 10$$

$$397.5 \checkmark$$

£ million [7]

AB = 3 km, AD = 5 km, CD = 12 km and angle BAC = 30°.

The land is sold for £10 million per square kilometre.

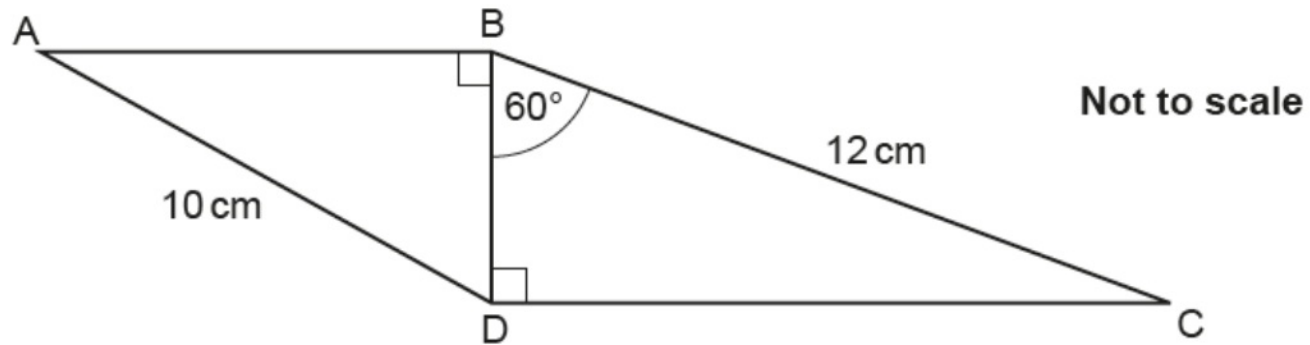
Calculate the total cost of the land.

$$\sin 30^\circ = \frac{\sqrt{1}}{2} = \frac{1}{2} = 0.5$$

Created by W Neill

- 11 The diagram shows two right-angled triangles ABD and BCD, sharing a common side BD.
AD = 10 cm, BC = 12 cm and angle DBC = 60° .

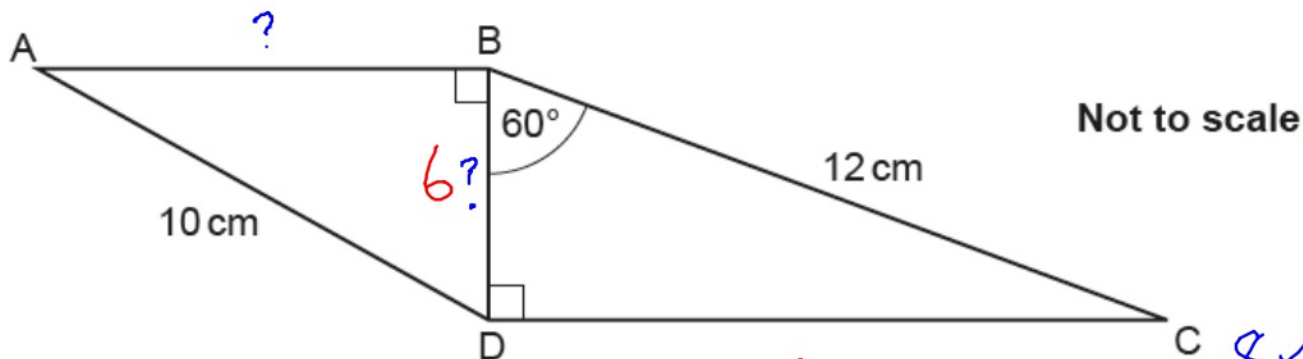
G46
G43



Work out the length of AB.

- 11 The diagram shows two right-angled triangles ABD and BCD, sharing a common side BD.
 AD = 10 cm, BC = 12 cm and angle DBC = 60°. Created by W Neill

G46
 G43
 G48

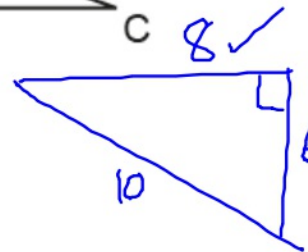


Work out the length of AB.

$\cos 60 = \frac{a}{12}$
 $\cos 60 = \frac{\sqrt{1}}{2} = \frac{1}{2} = 0.5$
 $a = 0.5 \times 12 = 6$

SHCA
 CHTA

AB =



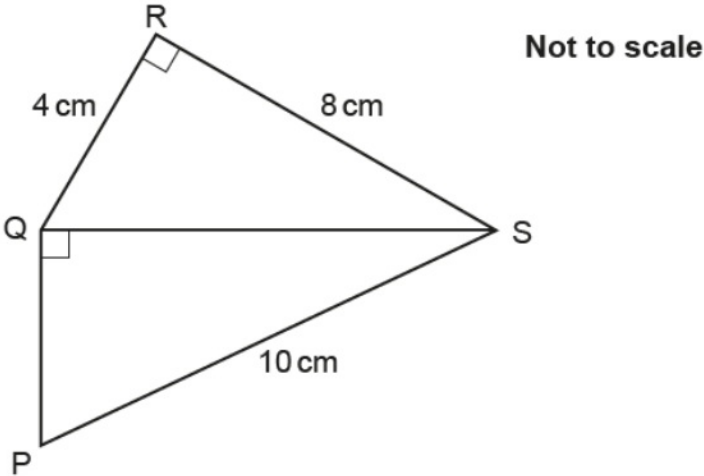
Pythagoras

$$10^2 - 6^2 = 64$$

$$\sqrt{64} = 8 \checkmark$$

12 The diagram below shows two right-angled triangles.

Created by W Neill



Prove that triangles PQS and QRS are similar.

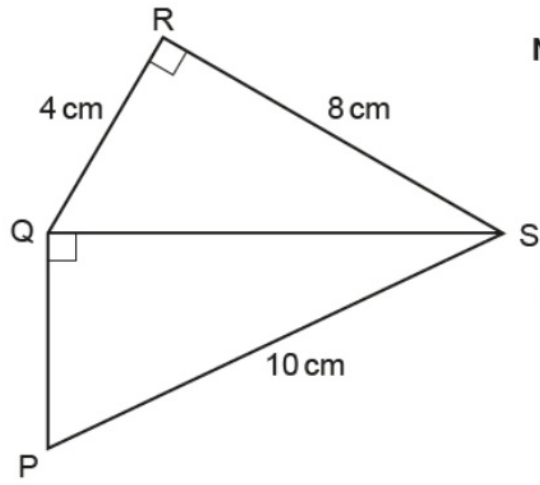
.....

.....

..... [5]

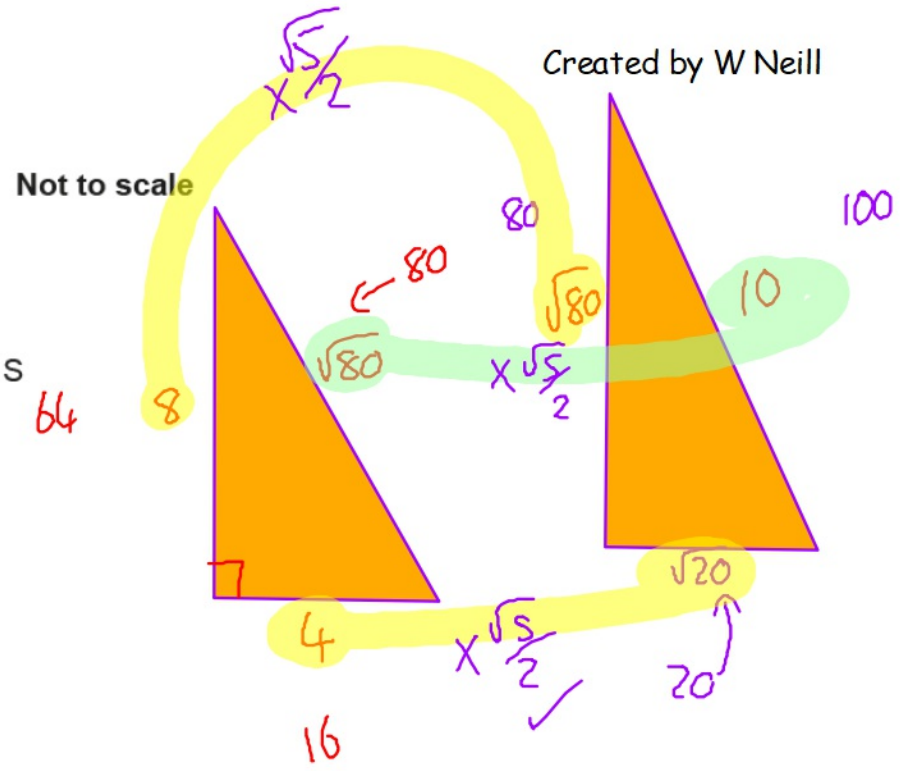
12 The diagram below shows two right-angled triangles.

643
650



Prove that triangles PQS and QRS are similar.

Created by W Neill

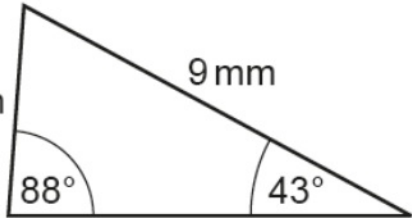


As they all have the same multiplier, the triangles are similar

.....

3 Here is Mario's answer to a question.

G43

Question 3	Answer
 <p data-bbox="398 799 797 834">Work out the value of x.</p>	$x = \sqrt{9^2 - 6^2}$ $x = \sqrt{45}$ $x = 6.708 \text{ (3 d.p.)}$

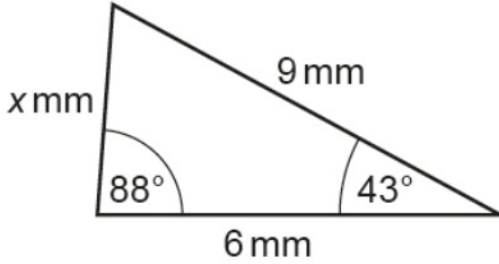
Explain the error in Mario's method.

.....

..... [1]

3 Here is Mario's answer to a question.

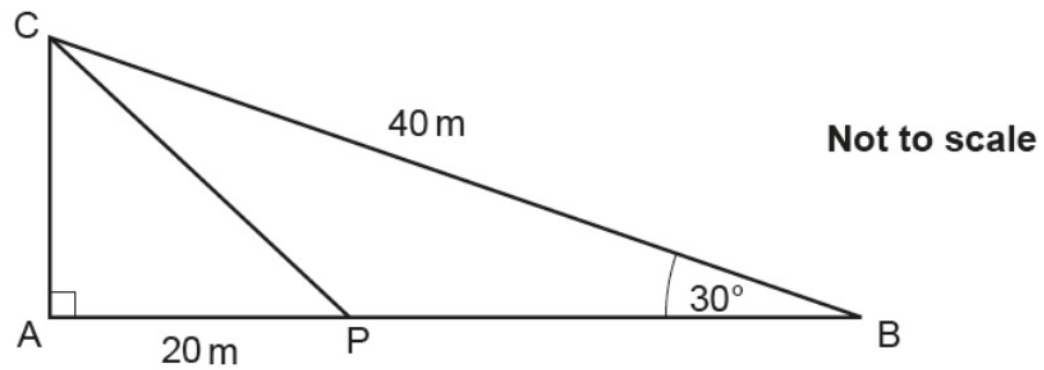
G43

Question 3	Answer
 <p data-bbox="398 798 1075 837">Work out the value of x.</p>	$x = \sqrt{9^2 - 6^2}$ $x = \sqrt{45}$ $x = 6.708 \text{ (3 d.p.)}$

Explain the error in Mario's method.

Pythagoras does not work as the triangle is not a right angled triangle. [1]

- 13 In the diagram, ABC is a right-angled triangle.
 P is a point on AB .
 $BC = 40\text{ m}$, $AP = 20\text{ m}$ and angle $ABC = 30^\circ$.



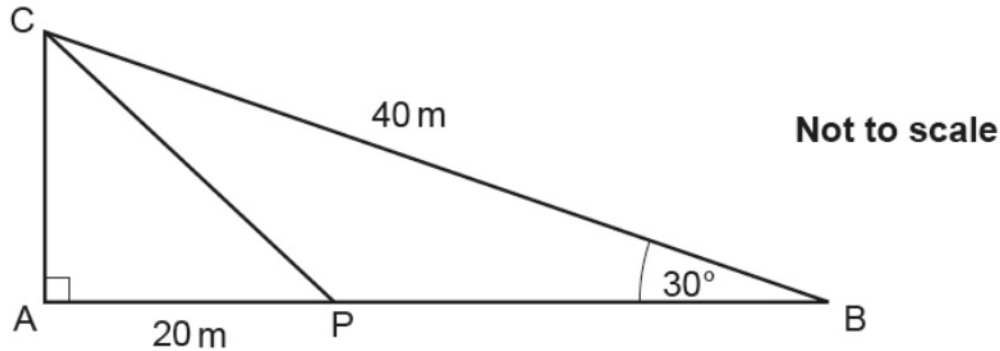
- (a) Show that $AC = 20\text{ m}$.

[3]

G46

G48

In the diagram, ABC is a right-angled triangle.
P is a point on AB.
BC = 40 m, AP = 20 m and angle ABC = 30°.

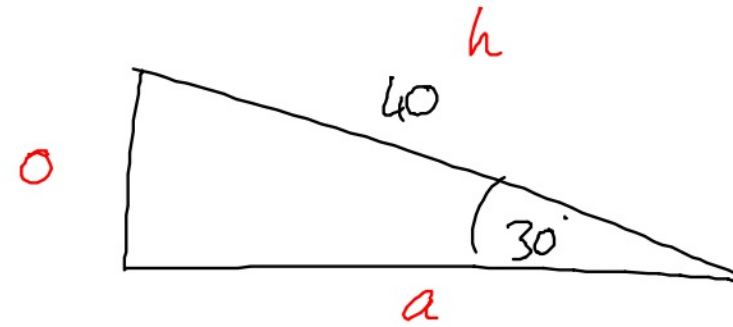
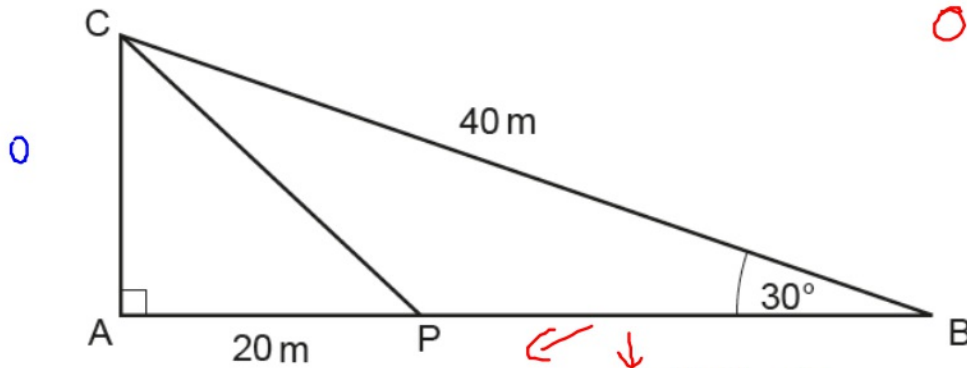


- (b) Find the length of PB.
Give your answer in the form $a(\sqrt{3} - b)$, where a and b are integers.

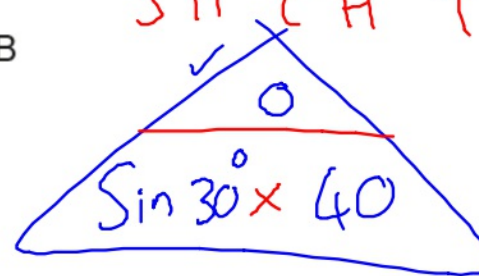
G43
N59

(b) [5]

- 13 In the diagram, ABC is a right-angled triangle.
 P is a point on AB.
 BC = 40 m, AP = 20 m and angle ABC = 30°.



S^oH C^AH T^oA



[3]

- (a) Show that AC = 20 m. ✓

G46

G48

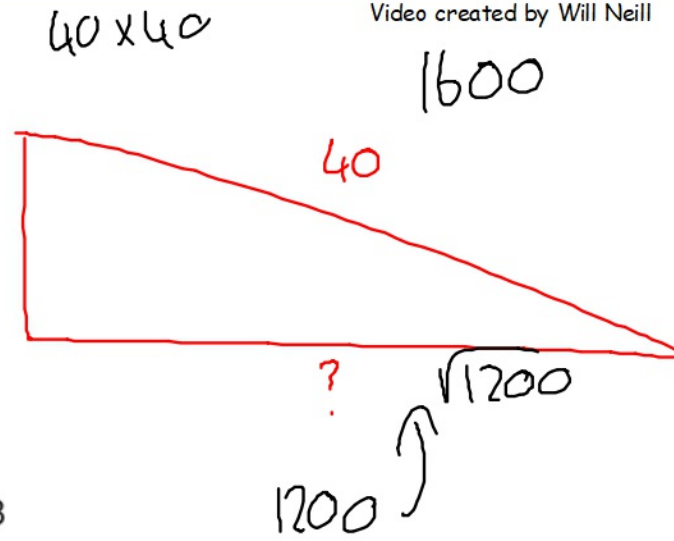
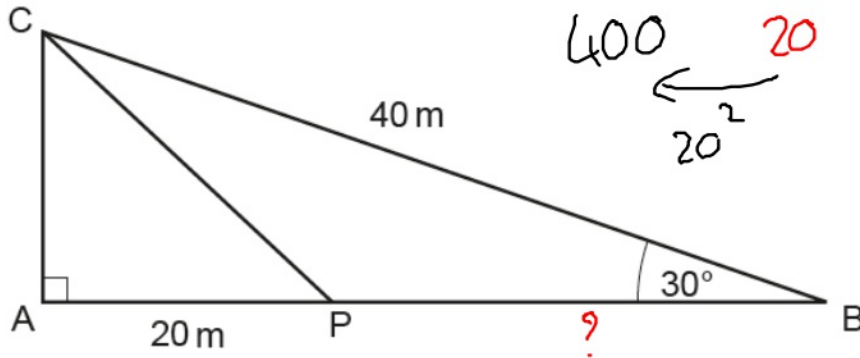
$\sin 30^\circ$

$\frac{\sqrt{1}}{2} = \frac{1}{2}$

$\frac{1}{2} \times 40$

$= 20 \text{ m} \checkmark$

In the diagram, ABC is a right-angled triangle.
 P is a point on AB.
 BC = 40 m, AP = 20 m and angle ABC = 30°.



- (b) Find the length of PB.
 Give your answer in the form $a(\sqrt{3} - b)$, where a and b are integers.

G43
 N59

$$PB = 20\sqrt{3} - 20$$

$$20(\sqrt{3} - 1)$$

$$\sqrt{1200}$$

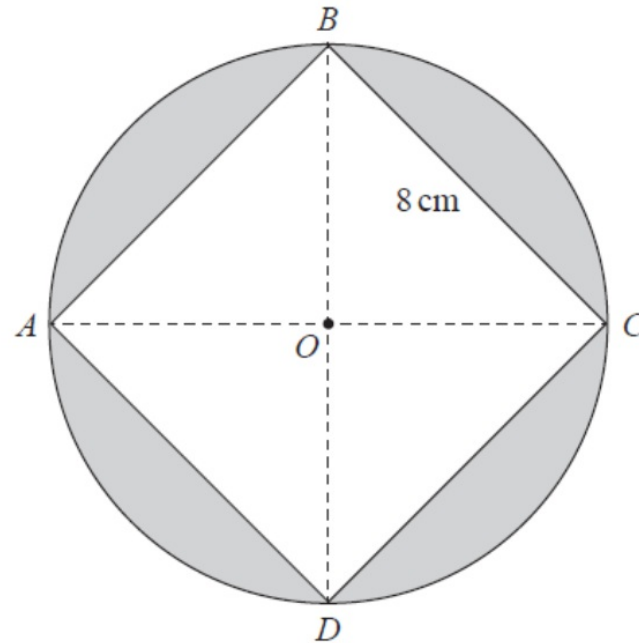
$$\frac{\sqrt{400}\sqrt{3}}{20\sqrt{3}}$$

(b) 20(\sqrt{3} - 1) [5]

Edexcel

- 26 The diagram shows a square $ABCD$ of side 8 cm inside a circle, centre O .
The vertices of the square lie on the circle.

Created by W Neill



Work out the total area of the four shaded segments.

Give your answer correct to 3 significant figures.

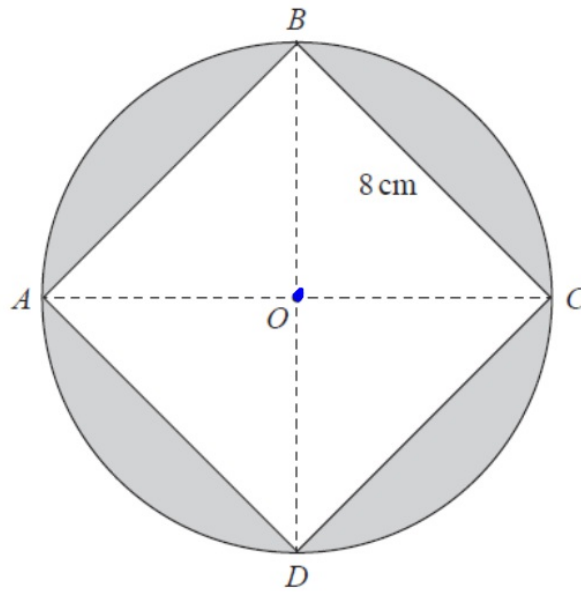
.....cm²

(Total for Question 26 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

26 The diagram shows a square $ABCD$ of side 8 cm inside a circle, centre O .
The vertices of the square lie on the circle.

Created by W Neill



$$\text{Square} = 8\text{cm} \times 8\text{cm} = 64\text{cm}^2$$

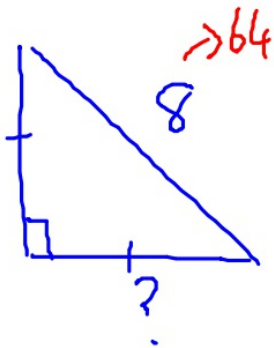
$$\text{Circle} \dots R^2 \times \pi$$

$$\hookrightarrow 5.6568^2 \times \pi$$

$$= 32\pi \text{ or } 100.5309$$

Work out the total area of the four shaded segments.

Give your answer correct to 3 significant figures.



$$a^2 + b^2 = c^2$$

$$2a^2 = c^2$$

$$2a^2 = 64$$

$$a^2 = 32$$

$$a = \sqrt{32} = 5.6568 \dots \text{cm}$$

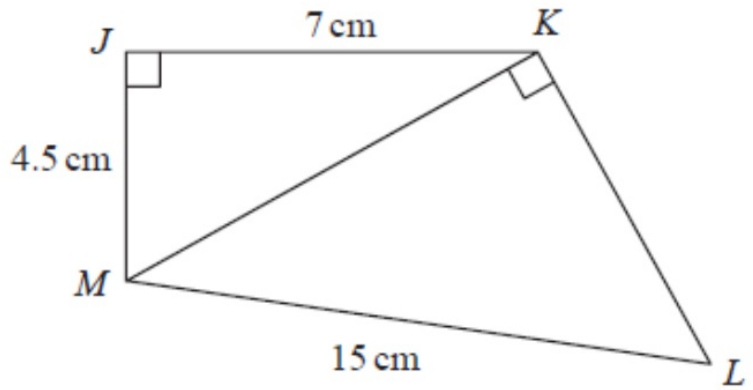
Area of shaded full - white = grey

$$100.53 - 64 =$$

$$= 36.530$$

$$36.5 \text{ cm}^2$$

24 The diagram shows a quadrilateral $JKLM$.



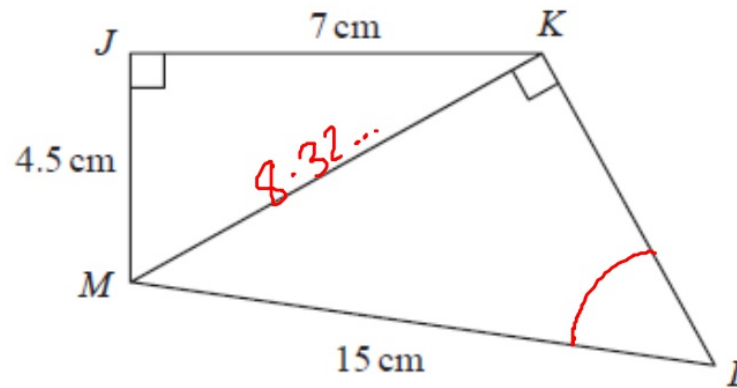
Work out the size of angle KLM .
Give your answer correct to 3 significant figures.

o

.....
(Total for Question 6 is 4 marks)

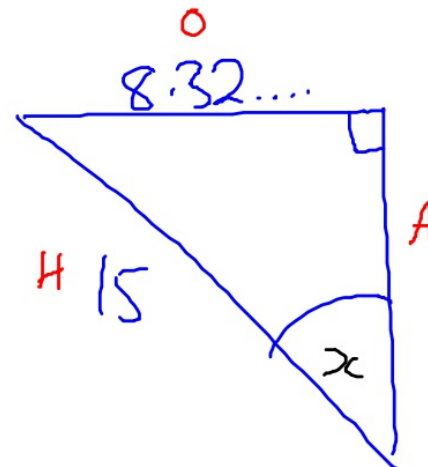
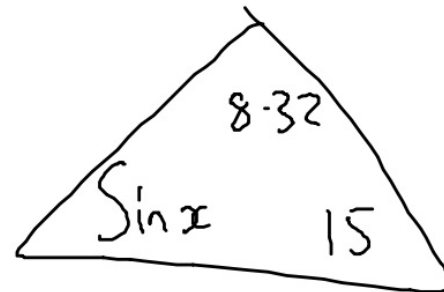
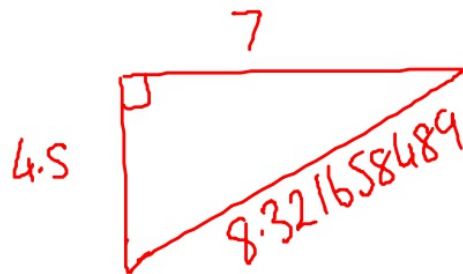
6 The diagram shows a quadrilateral $JKLM$.

Created by W Neill



$S^{\circ}H \quad C^A \quad H \quad T^{\circ}A$
✓

Work out the size of angle KLM .
Give your answer correct to 3 significant figures.



$$\sin x = 0.5547\dots$$

$$x = \sin^{-1} 0.5547$$

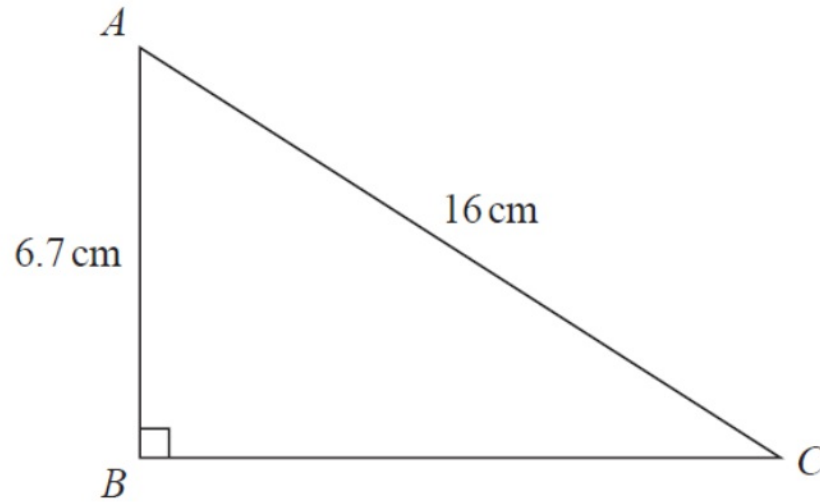
$$x =$$

$$\underline{33.7^{\circ}} \quad \checkmark$$

(Total for Question 6 is 4 marks)

21 ABC is a right-angled triangle.

G43



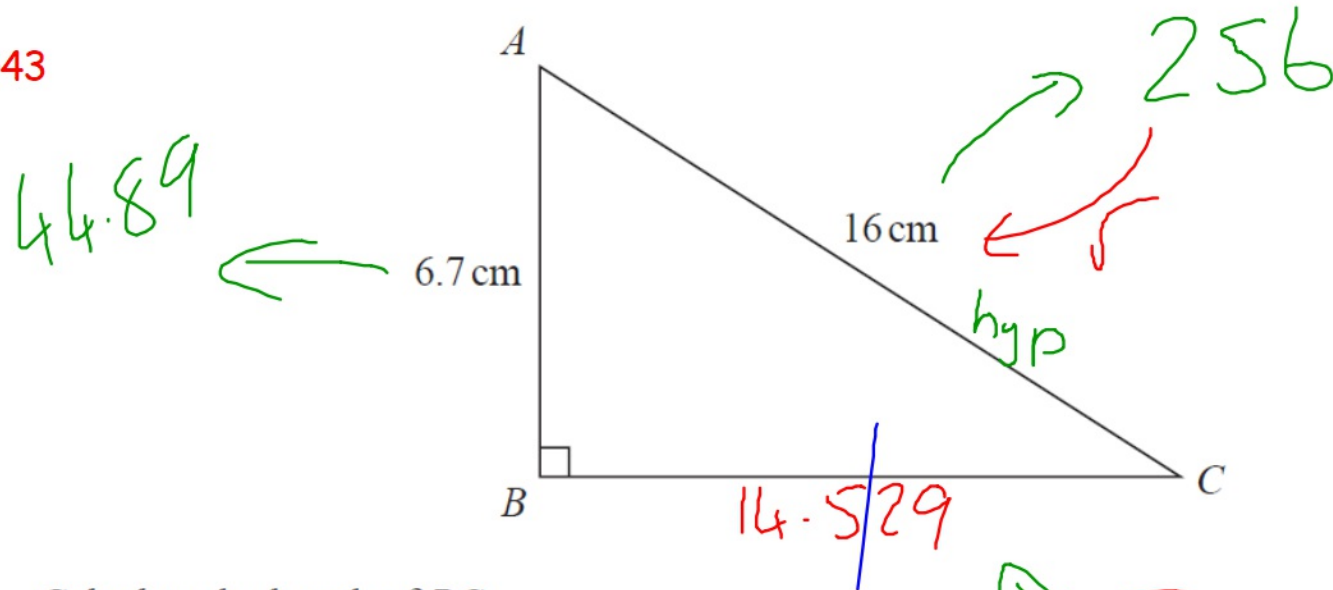
Calculate the length of BC .
Give your answer correct to 1 decimal place.

..... cm

(Total for Question 21 is 3 marks)

21 ABC is a right-angled triangle.

643



Calculate the length of BC .
Give your answer correct to 1 decimal place.

$$\boxed{211.11}$$

$$\dots\dots\dots 14.5 \text{ cm}$$

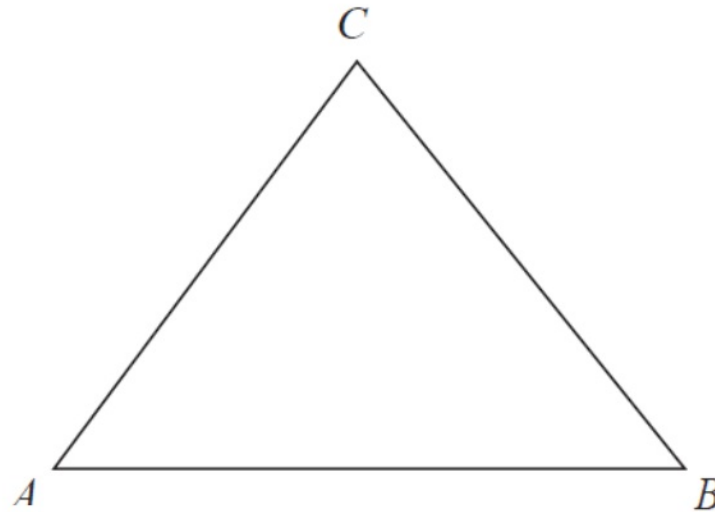
(Total for Question 21 is 3 marks)

26 The diagram shows triangle ABC .

R15a

G18

G44



The perimeter of the triangle is 64 cm.

$$AB : BC : CA = 6 : 5 : 5$$

Work out the area of the triangle.

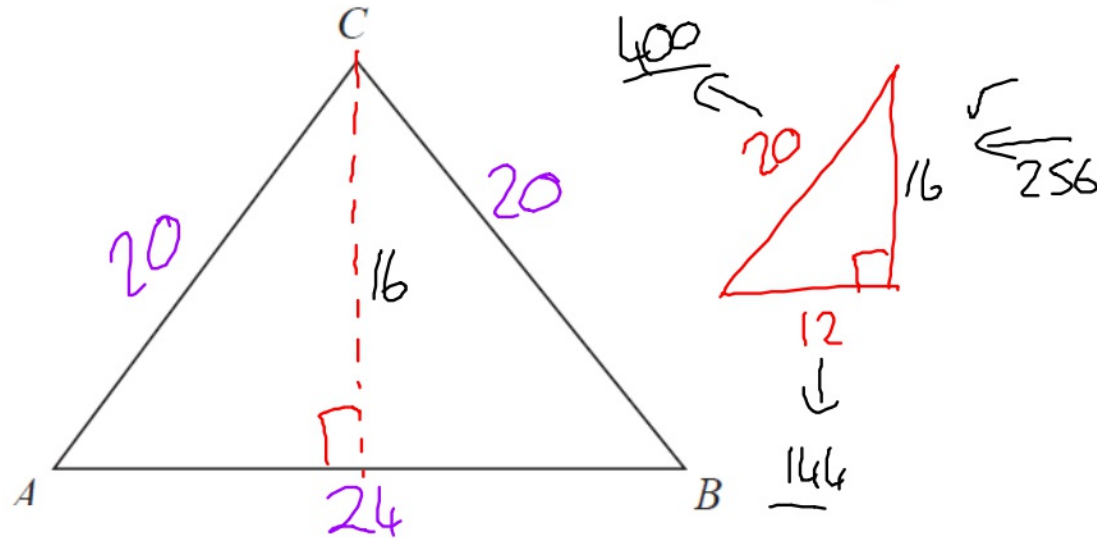
.....cm²

(Total for Question 26 is 5 marks)

26 The diagram shows triangle ABC .

R15a
G18
G44

$$\text{Area} = \frac{B \times H}{2}$$



The perimeter of the triangle is 64 cm.

$$AB : BC : CA = 6 : 5 : 5 \quad 16 \text{ parts}$$

Work out the area of the triangle.

$$\begin{aligned} 64 \text{ cm} &= 16 \text{ part} \\ 4 \text{ cm} &= 1 \text{ part} \end{aligned}$$

$$6 : 5 : 5$$

\swarrow \downarrow \downarrow
 24 20 20

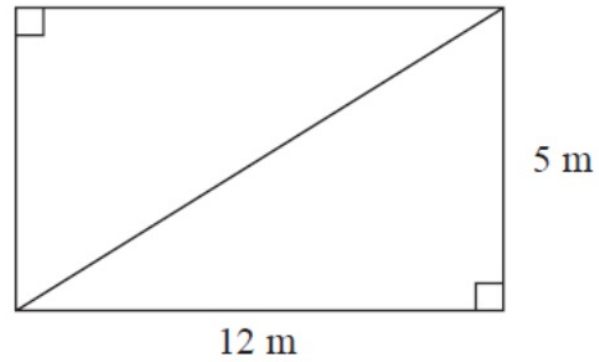
$$\frac{B \times H}{2} = \frac{24 \times 16}{2}$$

$$192 \text{ cm}^2$$

(Total for Question . . . is 5 marks)

25 This rectangular frame is made from 5 straight pieces of metal.

Video created by W Neill



The weight of the metal is 1.5 kg per metre.

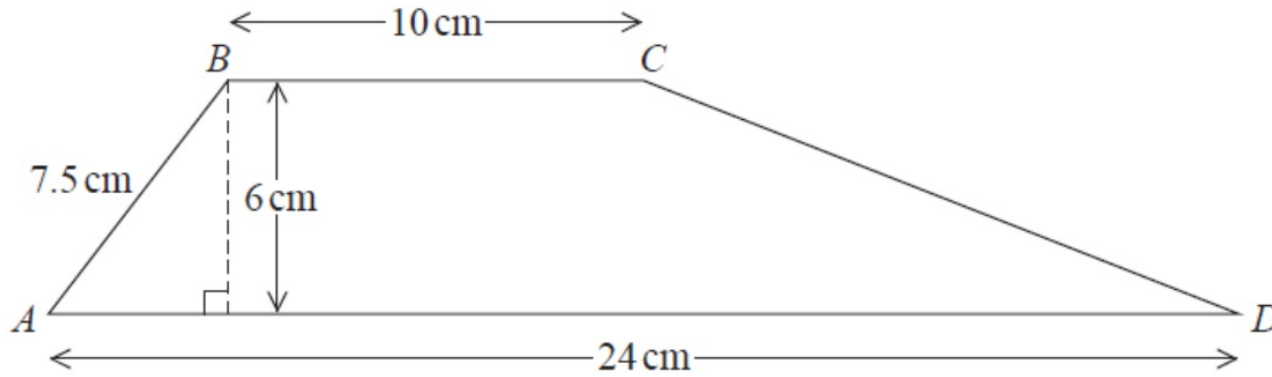
Work out the total weight of the metal in the frame.

..... kg

(Total for Question 25 is 5 marks)

22 $ABCD$ is a trapezium.

Created by W Neill

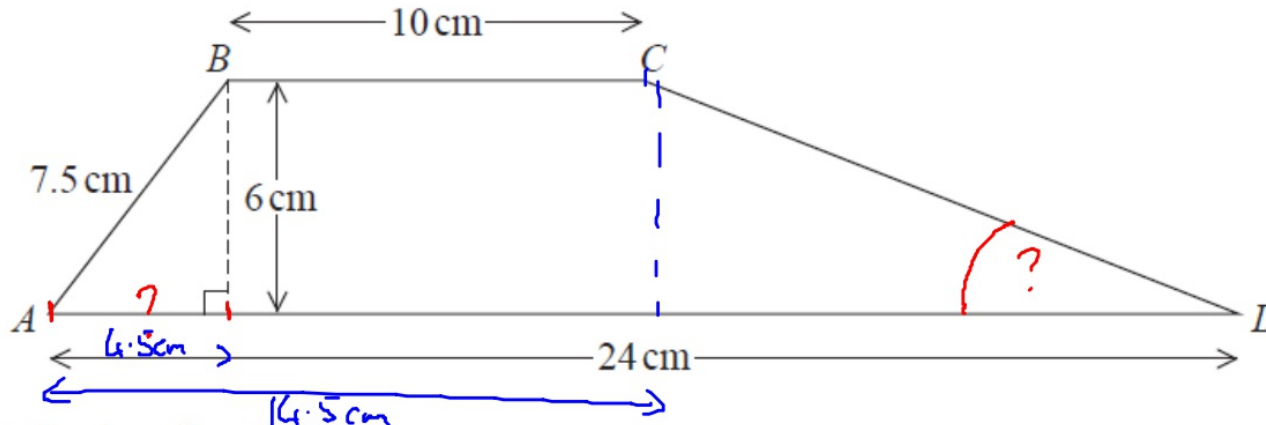


Work out the size of angle CDA .
Give your answer correct to 1 decimal place.

.....
(Total for Question 22 is 5 marks)

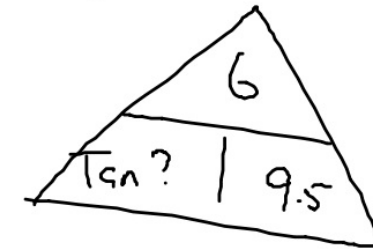
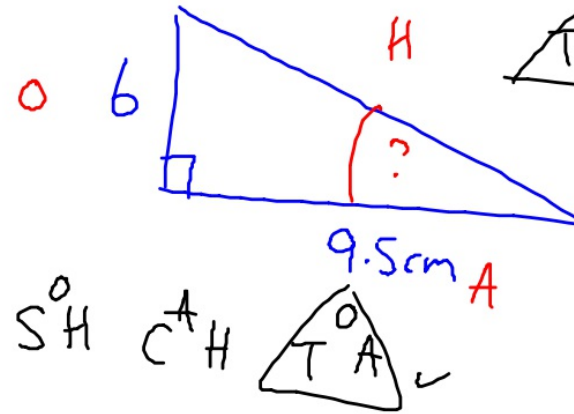
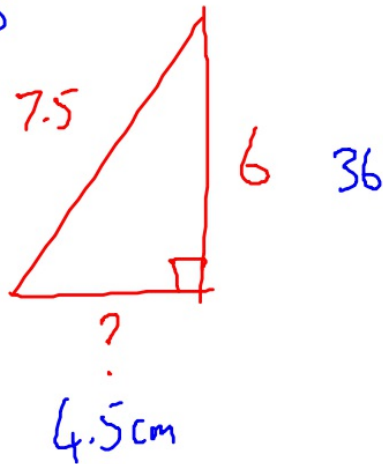
$ABCD$ is a trapezium.

Created by W Neill



Work out the size of angle CDA .
Give your answer correct to 1 decimal place.

56.25



$$\begin{aligned} \tan ? &= 0.63... \\ ? &= \tan^{-1} 0.63 \\ &= 32.3^\circ \end{aligned}$$

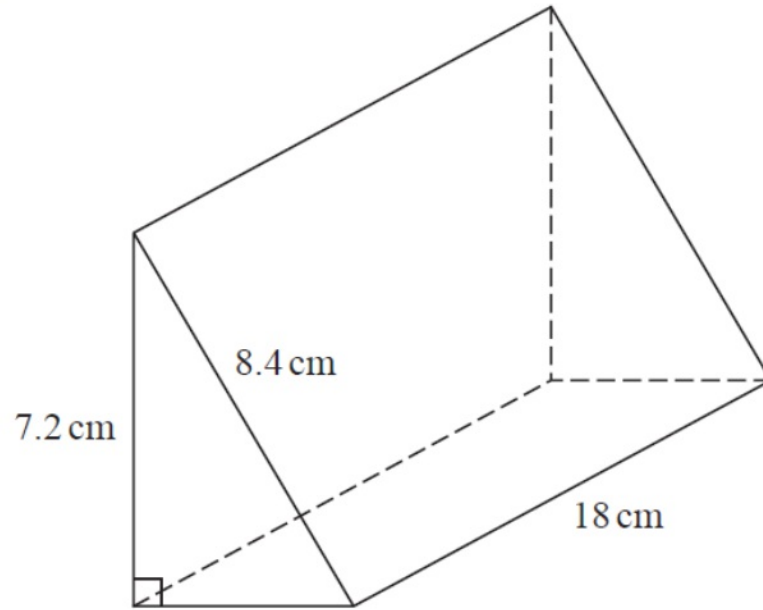
32.3 ✓

(Total for Question is 5 marks)

26 Here is a triangular prism.

Video created by W Neill

G43
G44
G32



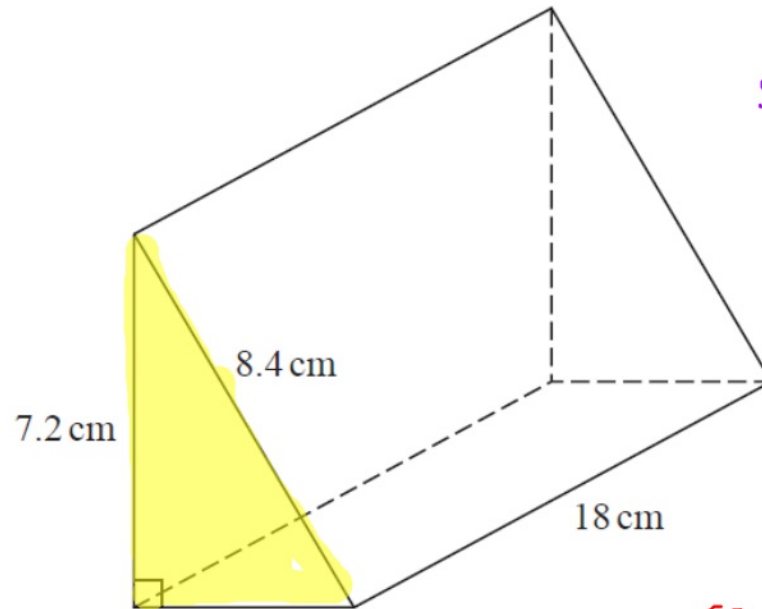
Work out the volume of the prism.
Give your answer correct to 3 significant figures.

..... cm³

(Total for Question 26 is 5 marks)

26 Here is a triangular prism.

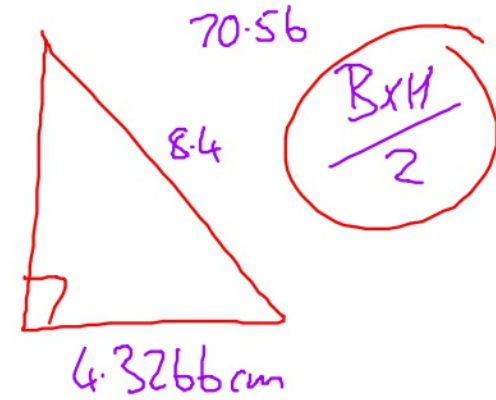
G43
G44
G32



Video created by W Neill

51.84

7.2



18.72 ↑

$$CS = \frac{B \times H}{2} = 15.57... \times 18$$

Area of CS x length

Work out the volume of the prism.

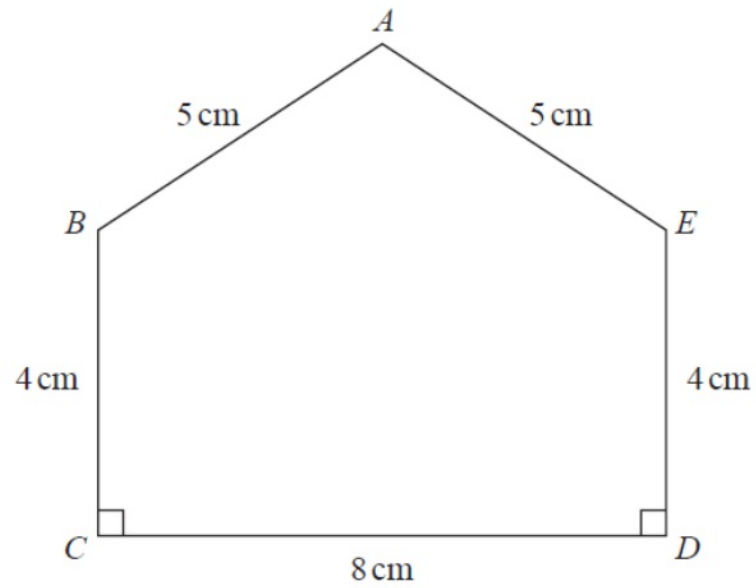
Give your answer correct to 3 significant figures.

..... 280 ✓ cm³

(Total for Question 26 is 5 marks)

3 $ABCDE$ is a pentagon.

Video created by W Neill

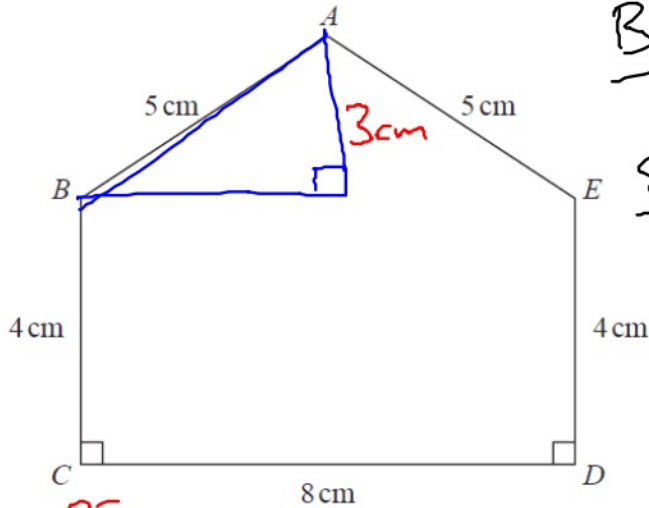


Work out the area of $ABCDE$.

..... cm^2

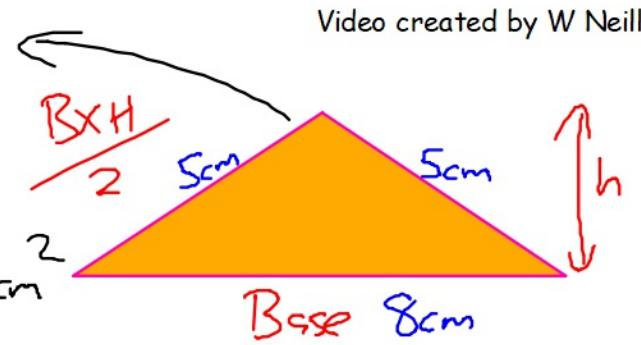
(Total for Question 3 is 5 marks)

4 *ABCDE* is a pentagon.



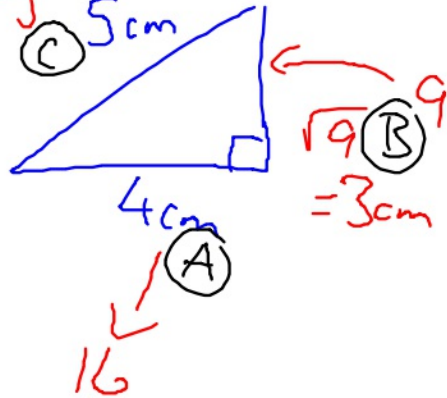
$$\frac{B \times H}{2}$$

$$\frac{8 \times 3}{2} = 12 \text{ cm}^2$$



Work out the area of *ABCDE*.

Pythagoras

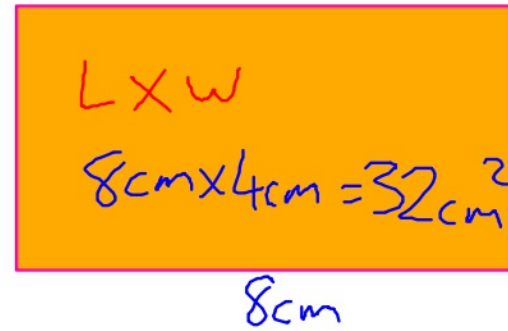


$$a^2 + b^2 = c^2$$

$$16 + 9 = 25$$

$$b^2 = 9$$

$$b = 3$$

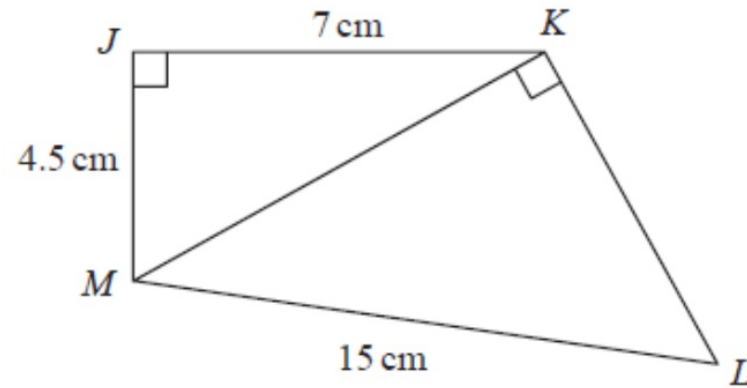


$$32 \text{ cm}^2 + 12 \text{ cm}^2$$

$$44 \text{ cm}^2$$

(Total for Question 19 is 5 marks)

6 The diagram shows a quadrilateral $JKLM$.

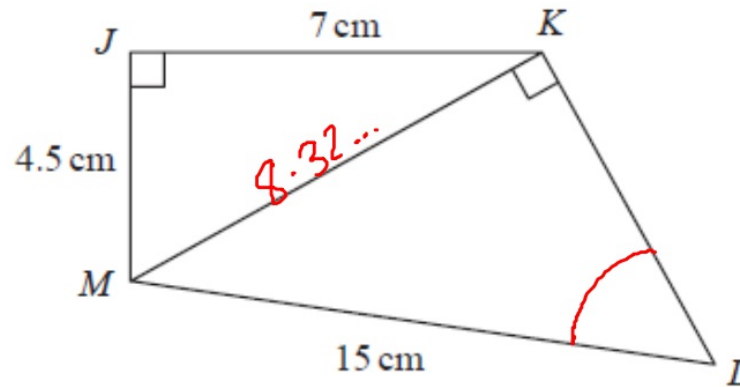


Work out the size of angle KLM .
Give your answer correct to 3 significant figures.

.....
(Total for Question 6 is 4 marks)

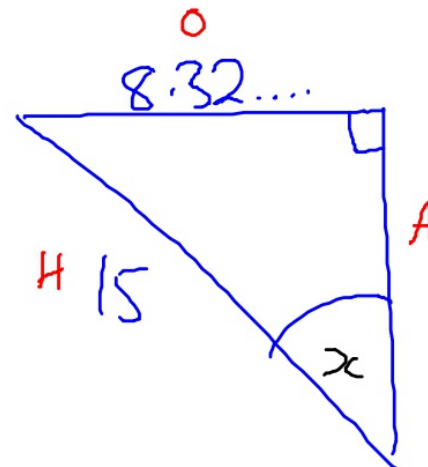
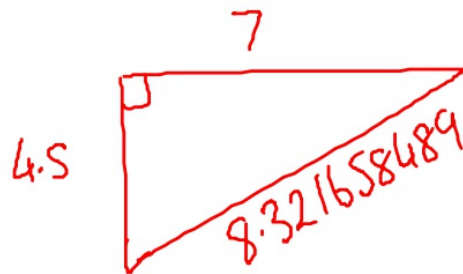
6 The diagram shows a quadrilateral $JKLM$.

Created by W Neill



$S^{\circ}H \quad C^A \quad H \quad T^{\circ}A$
✓

Work out the size of angle KLM .
Give your answer correct to 3 significant figures.



$$\sin x = 0.5547\dots$$

$$x = \sin^{-1} 0.5547$$

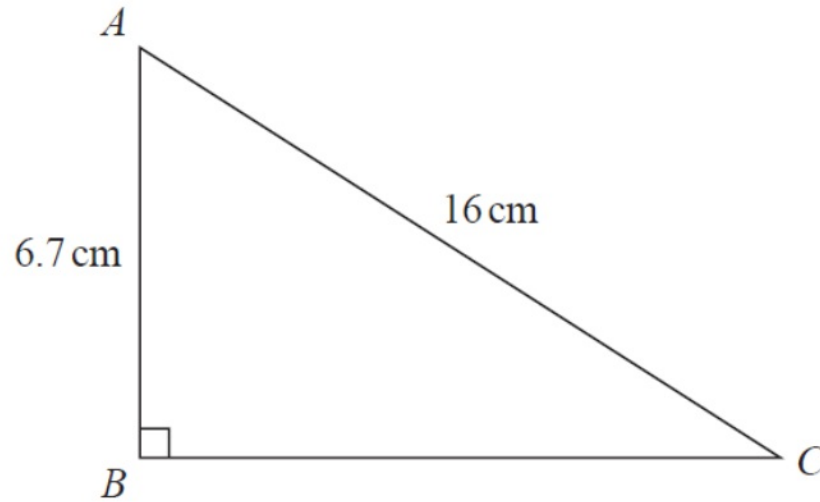
$$x =$$

$$\underline{33.7^{\circ}} \quad \checkmark$$

(Total for Question 6 is 4 marks)

3 ABC is a right-angled triangle.

G43



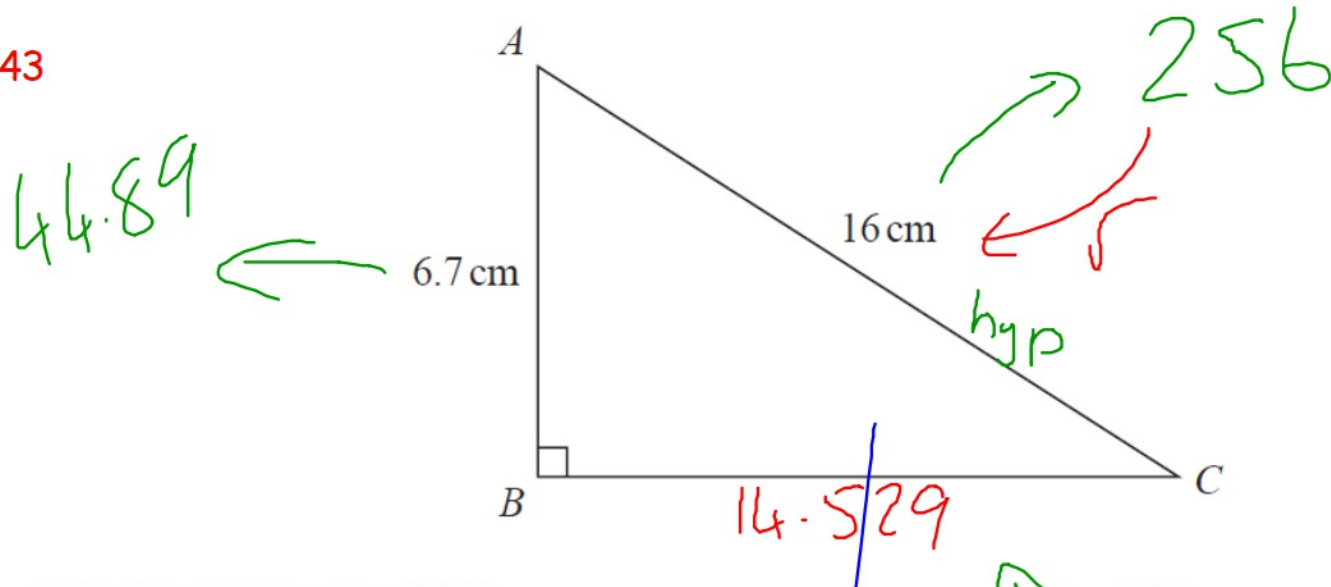
Calculate the length of BC .
Give your answer correct to 1 decimal place.

..... cm

(Total for Question 21 is 3 marks)

3 ABC is a right-angled triangle.

643



Calculate the length of BC .
Give your answer correct to 1 decimal place.

..... 14.5 cm ✓

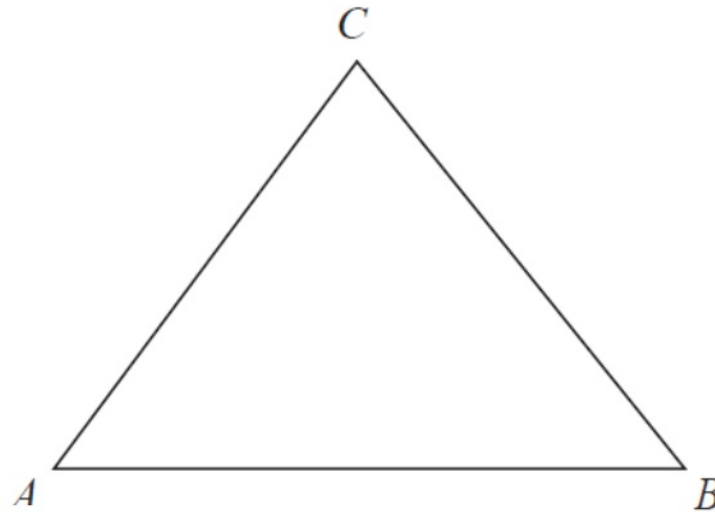
(Total for Question 21 is 3 marks)

7 The diagram shows triangle ABC .

R15a

G18

G44



The perimeter of the triangle is 64 cm.

$$AB : BC : CA = 6 : 5 : 5$$

Work out the area of the triangle.

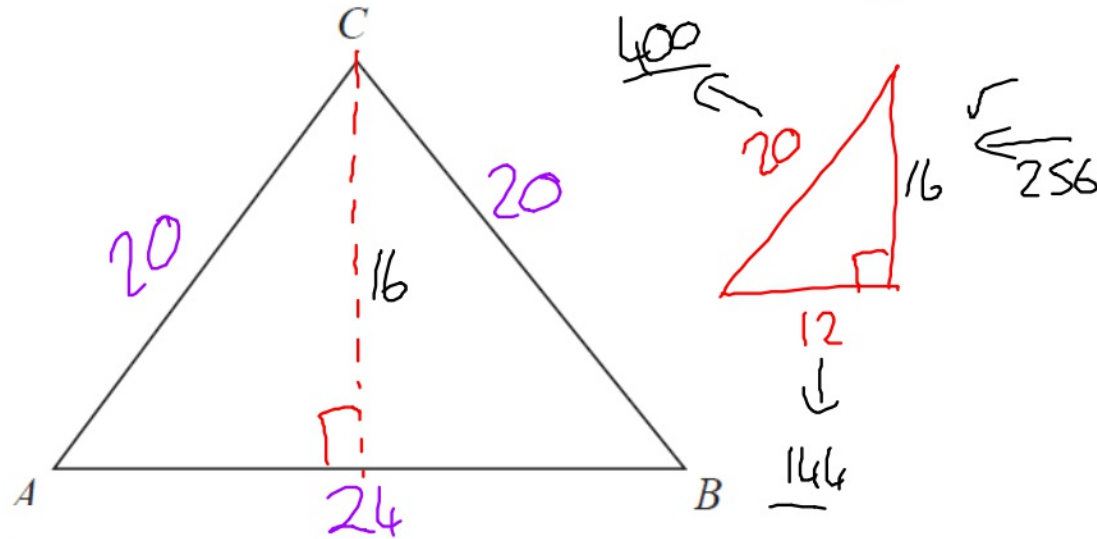
.....cm²

(Total for Question 7 is 5 marks)

7 The diagram shows triangle ABC .

R15a
G18
G44

$$\text{Area} = \frac{B \times H}{2}$$



The perimeter of the triangle is 64 cm.

$$AB : BC : CA = 6 : 5 : 5 \quad 16 \text{ parts}$$

Work out the area of the triangle.

$$64 \text{ cm} = 16 \text{ part}$$

$$4 \text{ cm} = 1 \text{ part}$$

$$6 : 5 : 5$$

\swarrow \downarrow \downarrow
 24 20 20

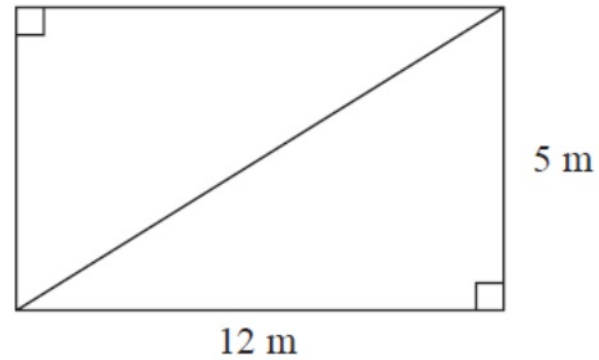
$$\frac{B \times H}{2} = \frac{24 \times 16}{2}$$

$$192 \text{ cm}^2$$

(Total for Question . . . is 5 marks)

5 This rectangular frame is made from 5 straight pieces of metal.

Video created by W Neill



The weight of the metal is 1.5 kg per metre.

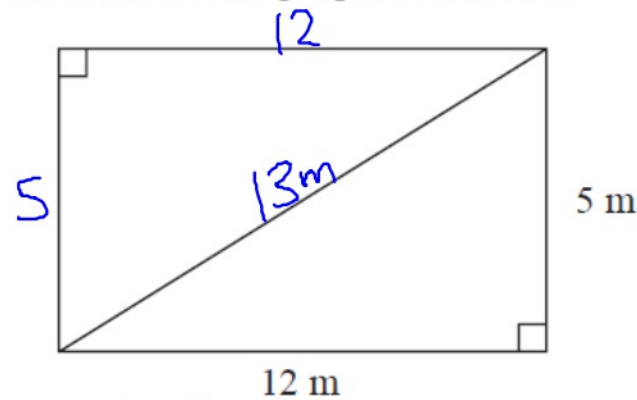
Work out the total weight of the metal in the frame.

..... kg

(Total for Question 25 is 5 marks)

5 This rectangular frame is made from 5 straight pieces of metal.

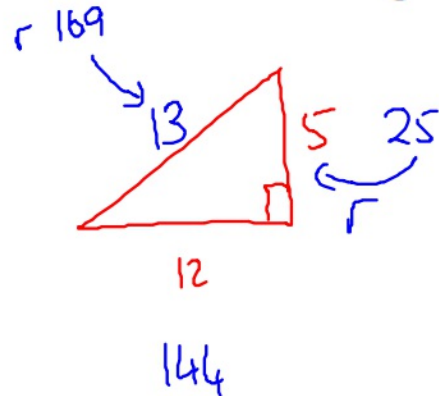
Video created by W Neill



$$\begin{array}{r} 24 \\ 10 \\ 13 \\ \hline 47 \text{ m} \end{array}$$

The weight of the metal is 1.5 kg per metre.

Work out the total weight of the metal in the frame.



$$47 \text{ m} \times 1.5 \text{ kg}$$

$$47 \times 15$$

$$\left[\begin{array}{l} 47 \times 10 = 470 \\ 47 \times 5 = 235 \end{array} \right]$$

$$\underline{705} \text{ kg}$$

$$705$$

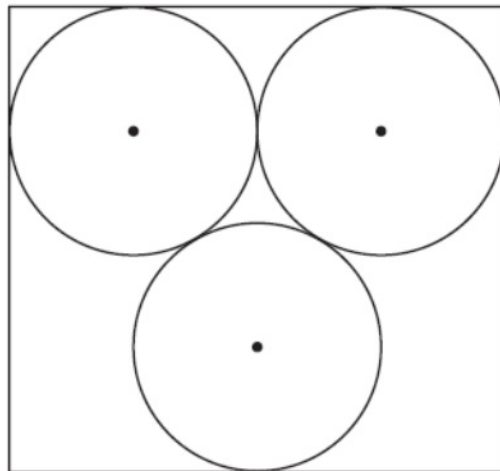
$$70.5 \checkmark$$

$$\dots\dots\dots 70.5 \text{ kg}$$

(Total for Question is 5 marks)

- 21 The diagram shows 3 identical circles inside a rectangle. Each circle touches the other two circles and the sides of the rectangle, as shown in the diagram.

Video created by W Neill



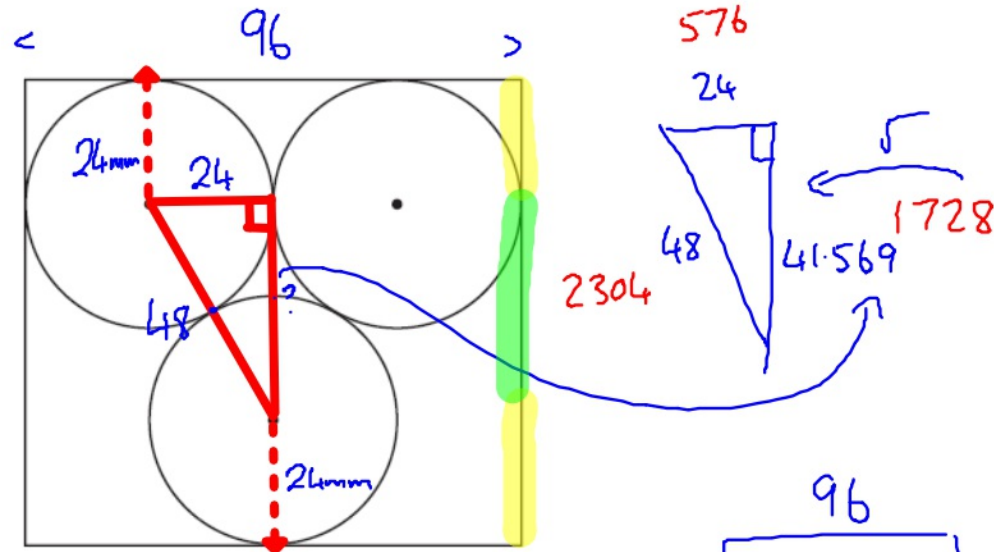
The radius of each circle is 24 mm.

Work out the area of the rectangle.

Give your answer correct to 3 significant figures.

21 The diagram shows 3 identical circles inside a rectangle. Each circle touches the other two circles and the sides of the rectangle, as shown in the diagram.

Video created by W Neill



The radius of each circle is 24 mm.

Work out the area of the rectangle.

Give your answer correct to 3 significant figures.

$L \times w$

$$\begin{aligned}
 & 96 \times 89.569\dots \\
 & = 8598.64 \\
 & = 8600 \checkmark
 \end{aligned}$$

Video created by W Neill

- 8** A square, with sides of length x cm, is inside a circle.
Each vertex of the square is on the circumference of the circle.

The area of the circle is 49 cm^2 .

Work out the value of x .

Give your answer correct to 3 significant figures.

.....
(Total for Question 8 is 4 marks)

8 A square, with sides of length x cm, is inside a circle.
Each vertex of the square is on the circumference of the circle.

The area of the circle is 49 cm^2 .

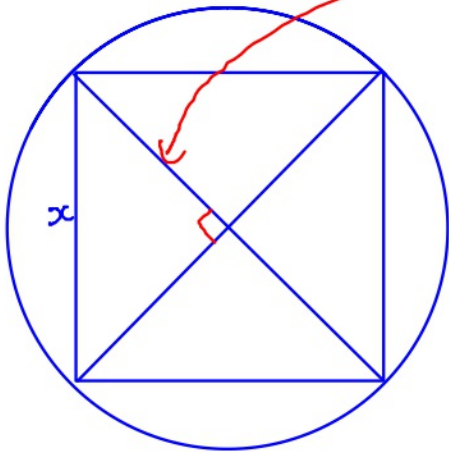
Work out the value of x .
Give your answer correct to 3 significant figures.

$$\pi r^2 = 49 \text{ cm}^2$$

$$r^2 = \frac{49}{\pi} = 15.59\dots$$

$$r = \sqrt{15.59\dots}$$

$$r = 3.949327085$$



31.14....

5.585
 x



3.949... 15.59...

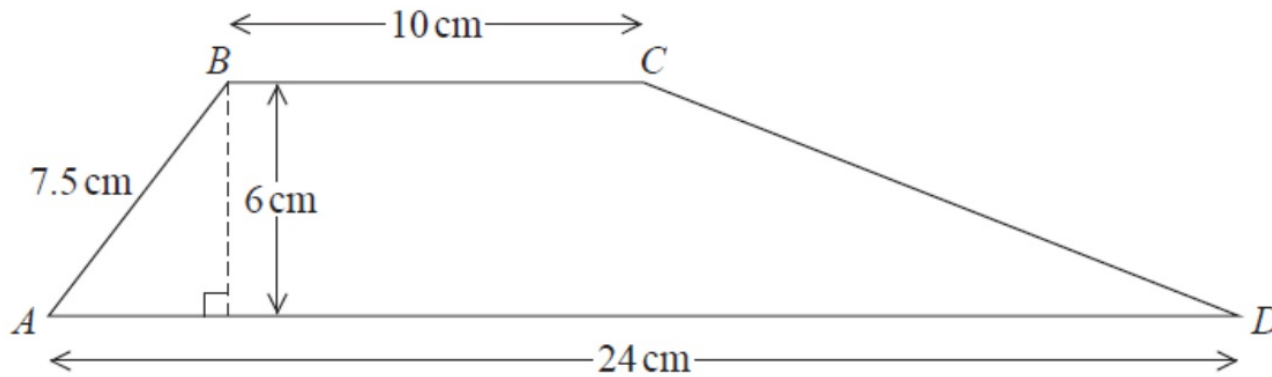
3.949...

5.59cm

15.59... (Total for Question 8 is 4 marks)

7 $ABCD$ is a trapezium.

Created by W Neill

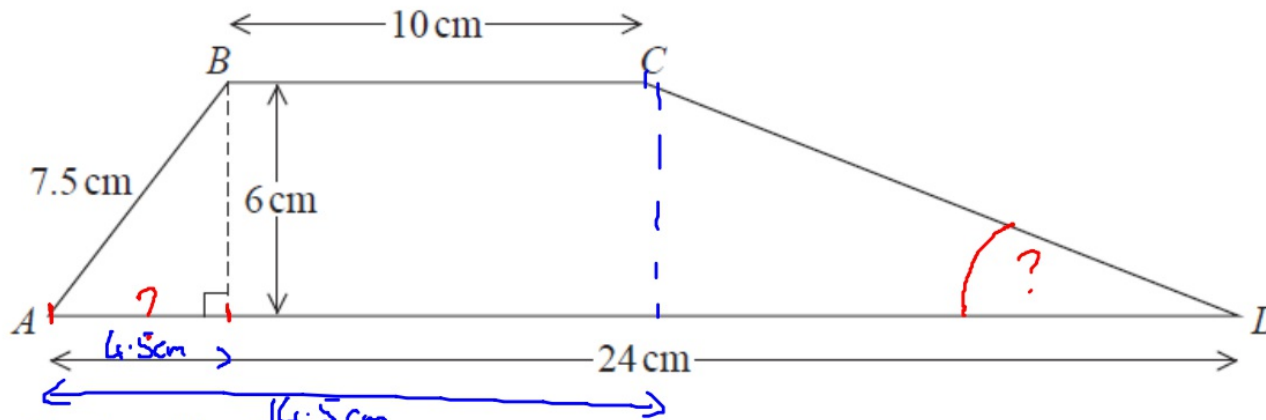


Work out the size of angle CDA .
Give your answer correct to 1 decimal place.

.....
(Total for Question is 5 marks)

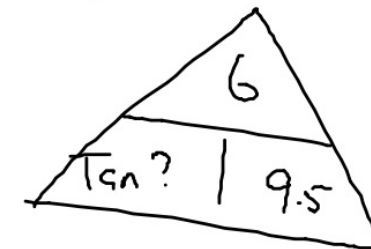
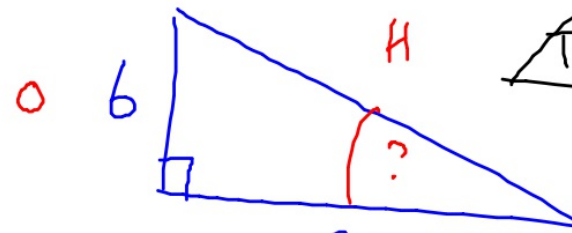
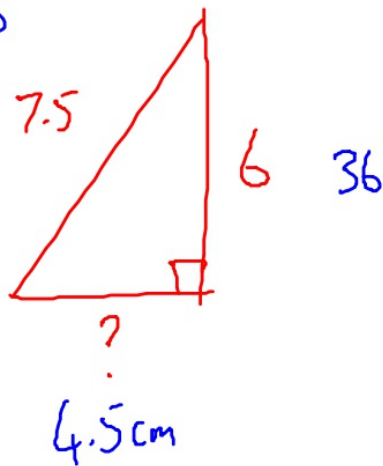
7 $ABCD$ is a trapezium.

Created by W Neill



Work out the size of angle CDA .
Give your answer correct to 1 decimal place.

56.25



$$\text{Tan?} = 0.63\dots$$

$$? = \text{Tan}^{-1} 0.63$$

$$= 32.3^\circ$$

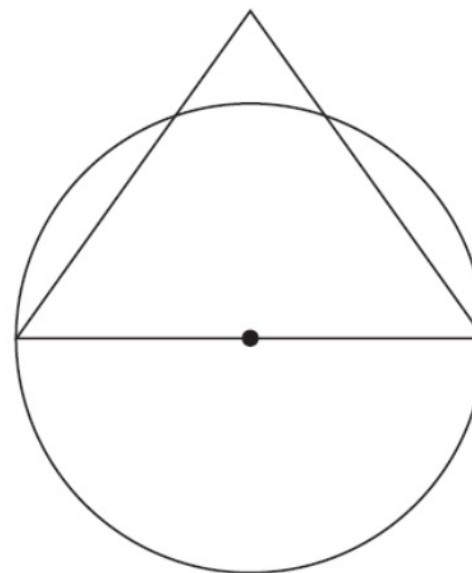
$$32.3^\circ \checkmark$$

(Total for Question is 5 marks)

13 The diagram shows a circle and an equilateral triangle.

One side of the equilateral triangle is a diameter of the circle.
The circle has a circumference of 44 cm.

Work out the area of the triangle.
Give your answer correct to 3 significant figures.



622

644

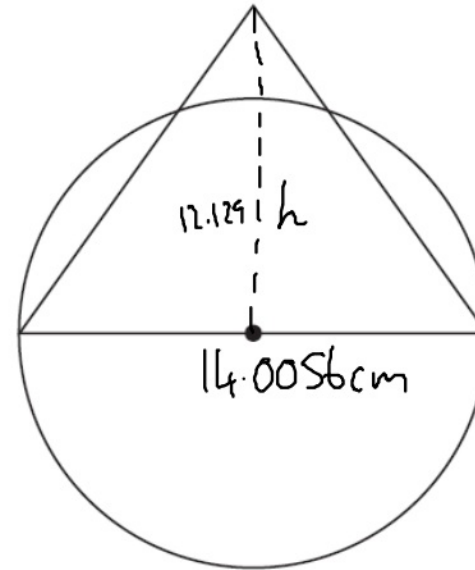
.....cm²

(Total for Question 13 is 3 marks)

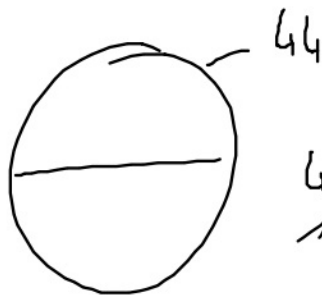
13 The diagram shows a circle and an equilateral triangle.

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The circle has a circumference of 44 cm.

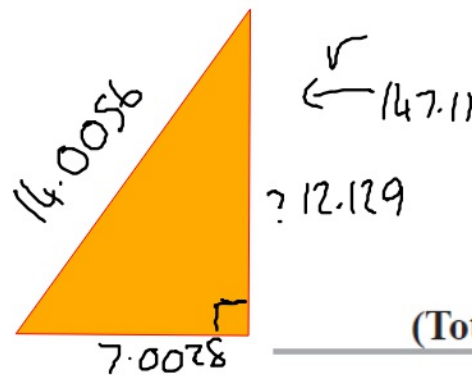
Work out the area of the triangle. — $\frac{B \times H}{2}$
Give your answer correct to 3 significant figures.



G22
G44



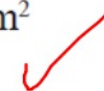
$$\frac{44}{\pi} = 14.0056 \text{ cm}$$



$$\frac{B \times H}{2} = \frac{14.0056 \times 12.129}{2}$$

84.9 cm²

(Total for Question 13 is 3 marks)



12 Here is a pyramid with a square base $ABCD$.

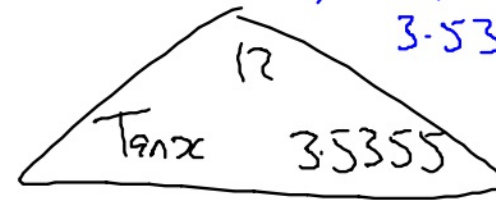
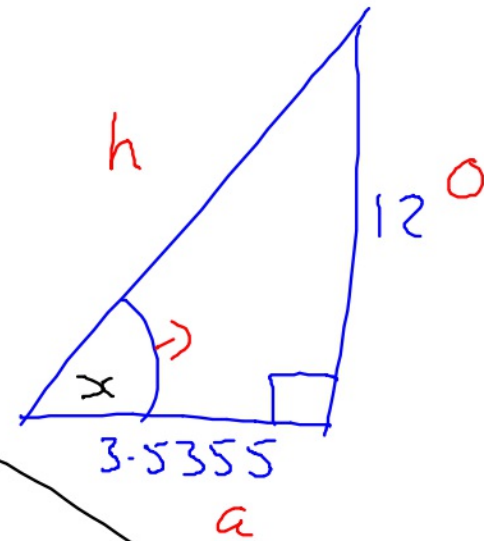
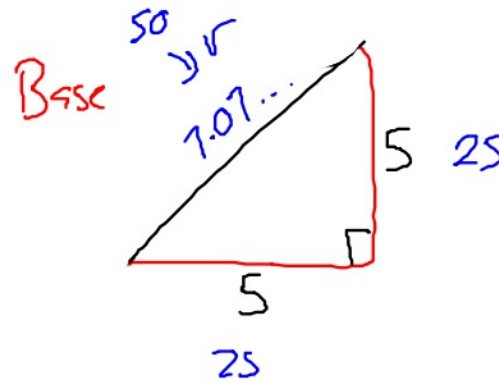
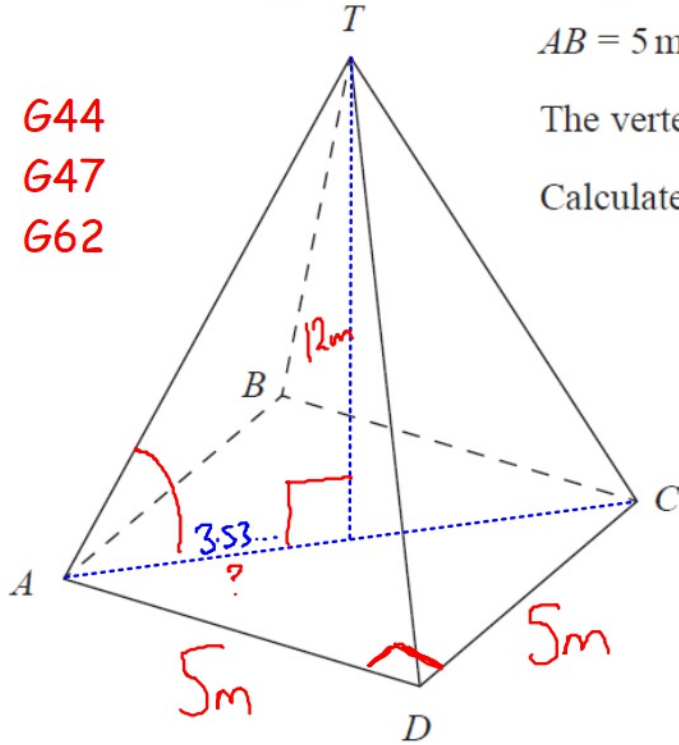
$AB = 5\text{ m}$

The vertex T is 12 m vertically above the midpoint of AC .

Calculate the size of angle TAC .

SOH CAHTOA ✓

G44
G47
G62



$\tan x = 3.394$ 73.6° ✓
 $x = \tan^{-1} 3.394$

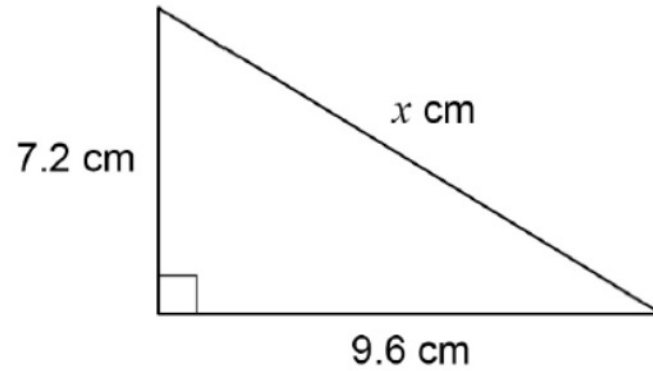
AQA

19

Here is a right-angled triangle.

G43

Not drawn
accurately



Show that $x = 12$

[2 marks]

19

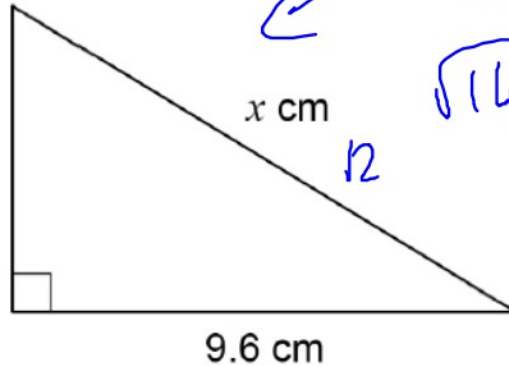
Here is a right-angled triangle.

643

Not drawn accurately

51.84

7.2 cm



144

$$\sqrt{144} = 12$$

Show that $x = 12$

92.16

[2 marks]

$$\sqrt{144} = 12 \text{ cm}$$

✓

15 Sami is trying to work out the exact value of y using Pythagoras' theorem.

Video created by W Neill

G44

A3

Here is her working.

$$(2y)^2 = 6^2 + 8^2$$

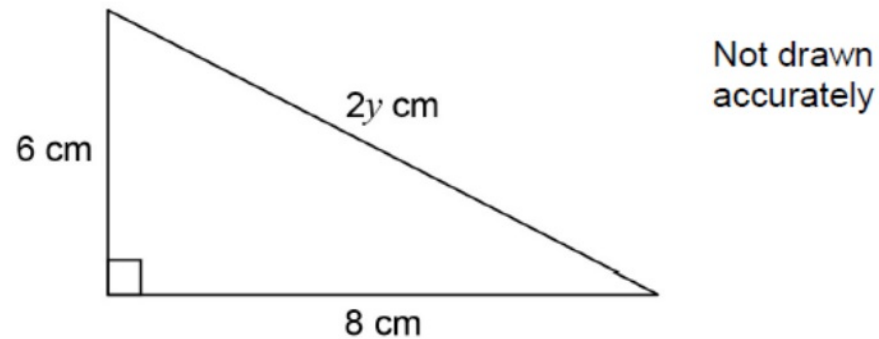
$$2y^2 = 36 + 64$$

$$2y^2 = 100$$

$$y^2 = 100 \div 2$$

$$y^2 = 50$$

$$y = \sqrt{50}$$



15 (a) What error has she made in her working?

[1 mark]

15

Sami is trying to work out the exact value of y using Pythagoras' theorem.

Video created by W Neill

G44

A3

Here is her working.

$$(2y)^2 = 6^2 + 8^2$$

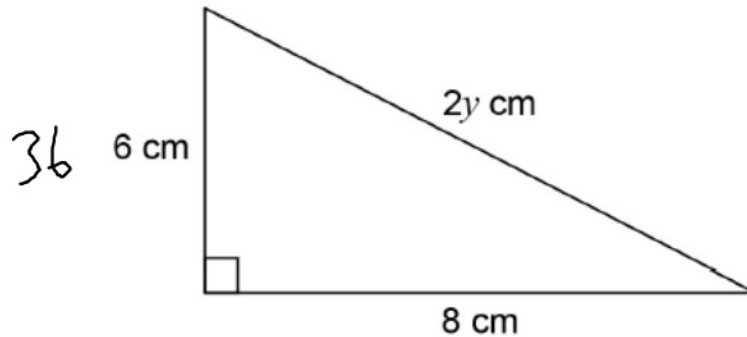
$$4y^2 = 36 + 64$$

$$2y^2 = 100$$

$$y^2 = 100 \div 2$$

$$y^2 = 50$$

$$y = \sqrt{50}$$



Not drawn accurately

84

$$(2y)^2$$
$$2y \times 2y$$
$$= 4y^2$$

15 (a) What error has she made in her working?

[1 mark]

15 (b) Kai works out that $y = 5$

G44

Mel says,

A3

“ y cannot be 5 because the hypotenuse should be the longest side and the other sides are longer than 5 cm”

Is Mel correct?

Tick a box.

Yes

No

Give a reason for your answer.

[1 mark]

15 (b) Kai works out that $y = 5$

G44

A3

Mel says,

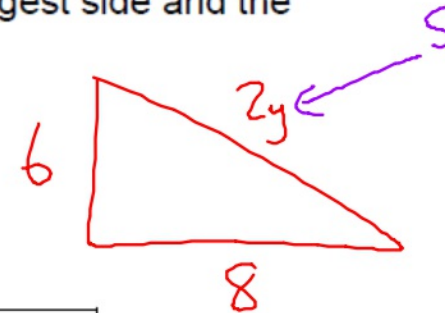
" y cannot be 5 because the hypotenuse should be the longest side and the other sides are longer than 5 cm"

Is Mel correct?

Tick a box.

Yes

No



Give a reason for your answer.

[1 mark]

y must be x by 2. $5 \times 2 = 10$
 $10 > 6$ or 8 ✓

25

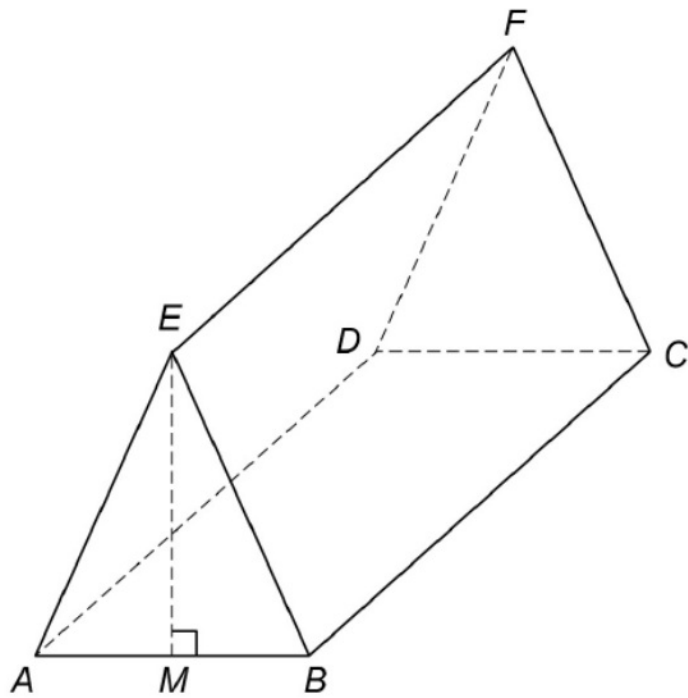
Rectangle $ABCD$ is the horizontal base of a triangular prism $ABCDEF$.

Video created by W Neill

$$AE = BE$$

E is vertically above M , the midpoint of AB .

$$AB = 16 \text{ cm} \quad AE = 17 \text{ cm} \quad BC = 30 \text{ cm}$$



25 (a) Show that $EM = 15 \text{ cm}$

[2 marks]

664

25

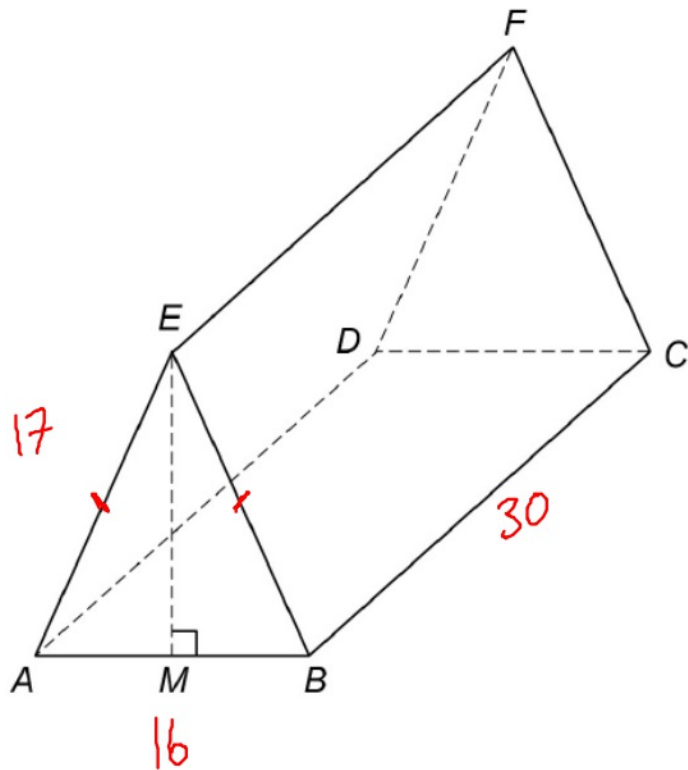
Rectangle $ABCD$ is the horizontal base of a triangular prism $ABCDEF$.

Video created by W Neill

$$AE = BE$$

E is vertically above M , the midpoint of AB .

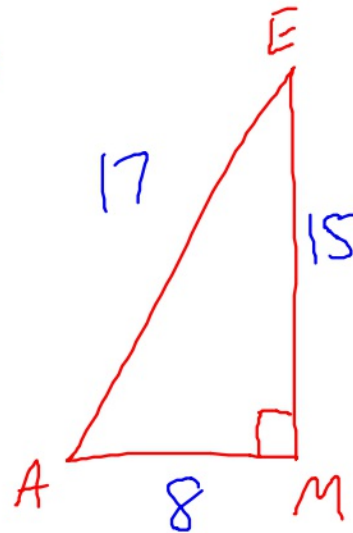
$$AB = 16 \text{ cm} \quad AE = 17 \text{ cm} \quad BC = 30 \text{ cm}$$



25 (a) Show that $EM = 15 \text{ cm}$

[2 marks]

G44



$$17^2 - 8^2 = 225$$

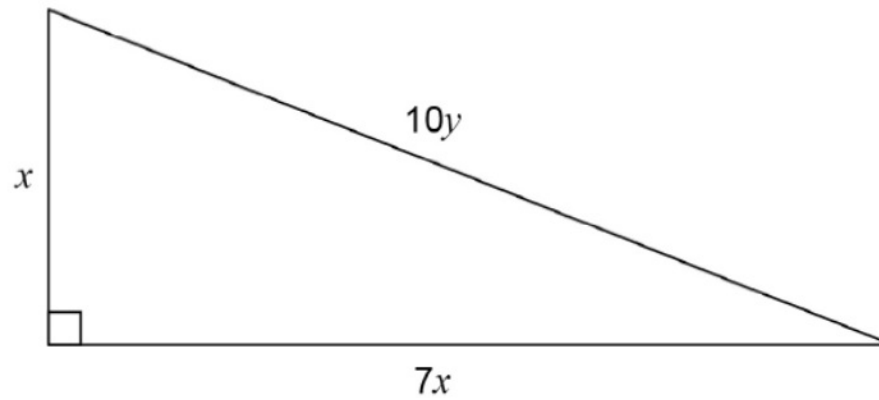
20

All dimensions are in centimetres.

Video created by W Neill

G43

A16



Not drawn accurately

Use Pythagoras' theorem to work out the exact value of $\frac{x}{y}$

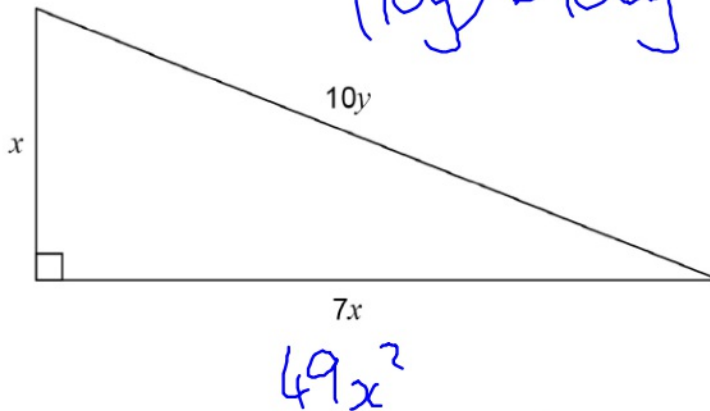
[3 marks]

Answer _____

G43

A16

x^2

Use Pythagoras' theorem to work out the exact value of $\frac{x}{y}$

$$\begin{aligned} (7x)^2 &= 7x \times 7x \\ &= 49x^2 \end{aligned}$$

[3 marks]

$$x^2 + 49x^2 = 100y^2$$

$$50x^2 = 100y^2$$

$$x^2 = 2y^2$$

$$x = \sqrt{2}(y)$$

$$\frac{x}{y} = \sqrt{2}$$

Answer

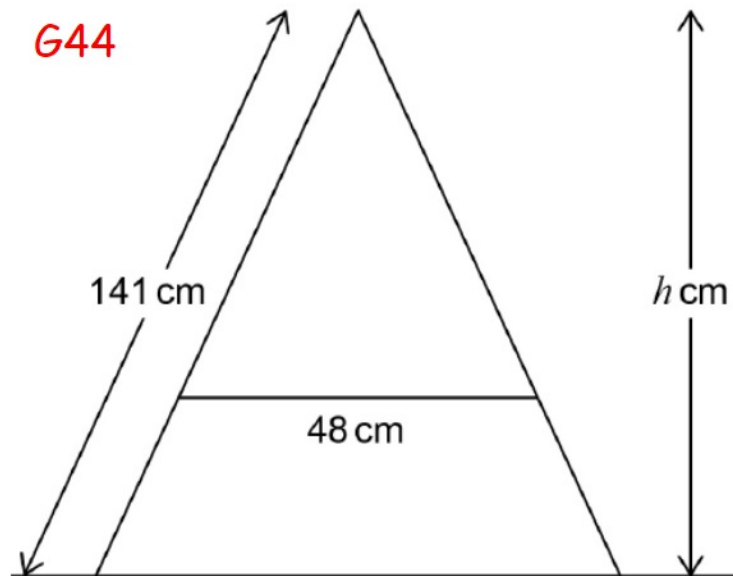
$$\underline{\underline{\sqrt{2}}}$$

23

The diagram shows the side view of a step ladder with a horizontal strut of length 48 cm

The strut is one third of the way up the ladder.

The symmetrical cross section of the ladder shows two similar triangles.



Work out the vertical height, h cm, of the ladder. **[5 marks]**

Answer _____ cm

