



EXAM PAPERS PRACTICE

GCSE OCR Math J560
Pythagoras

Answers

*"We will help you to
achieve A Star "*



Answer 1

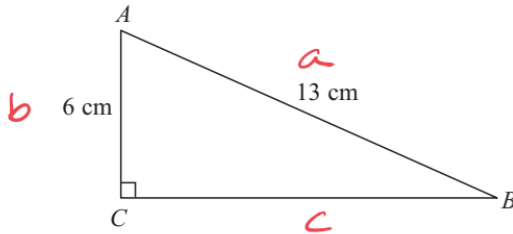


Diagram NOT accurately drawn

ABC is a right-angled triangle.
AC = 6 cm
AB = 13 cm

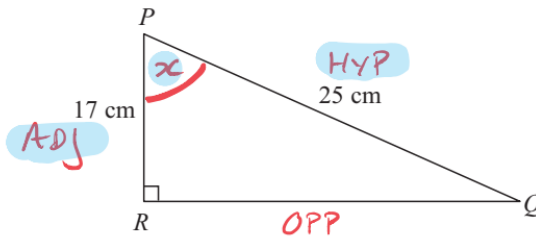
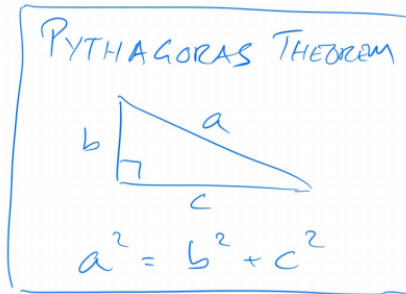
Work out the length of BC.
Give your answer correct to 3 significant figures.

$$13^2 = 6^2 + c^2$$
$$-6^2 \quad -6^2$$

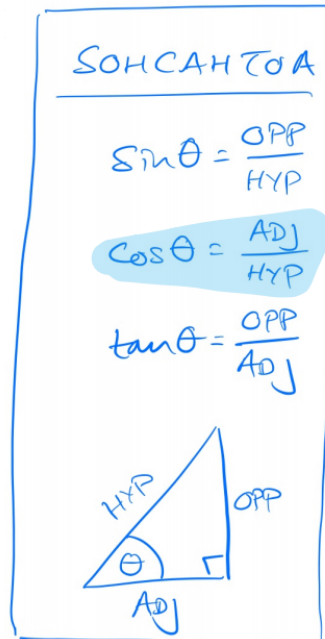
$$13^2 - 6^2 = c^2$$

SQ. RT.

$$c = \sqrt{13^2 - 6^2} = \underline{\underline{11.5 \text{ cm}}}$$

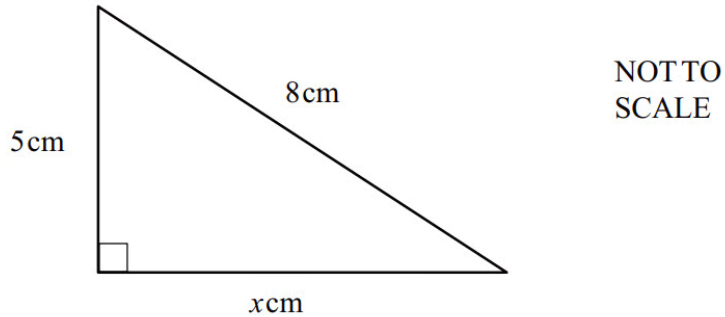


PQR is a right-angled triangle.
PR = 17 cm
PQ = 25 cm





Answer 2



Calculate the value of x .

The triangle is a right angle triangle, therefore we can use Pythagora's rule to work out the value of x .

$$(8\text{cm})^2 = (5\text{cm})^2 + (x\text{ cm})^2$$

$$64 = 25 + x^2$$

Subtract 25 from both sides of the equation.

$$39 = x^2$$

Take the positive root.

$$x = 6.24$$



Answer 3

XYZ is a right-angled triangle.

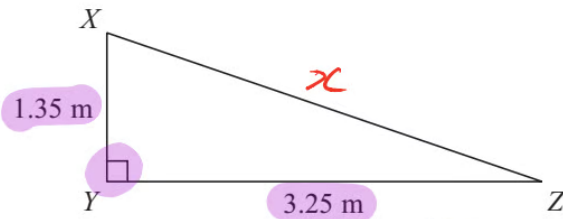


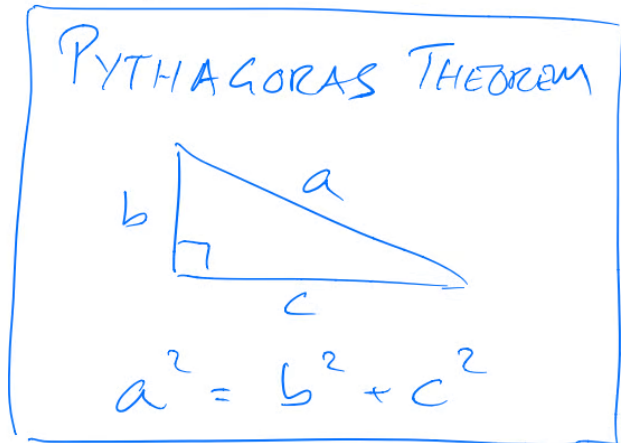
Diagram **NOT** accurately drawn

Calculate the length of XZ.
Give your answer correct to 3 significant figures.

$$\sqrt{x^2} = \sqrt{1.35^2 + 3.25^2}$$

$$x = \sqrt{1.35^2 + 3.25^2}$$

$$= \underline{\underline{3.52 \text{ m}}}$$





Answer 4

Here is a right-angled triangle.

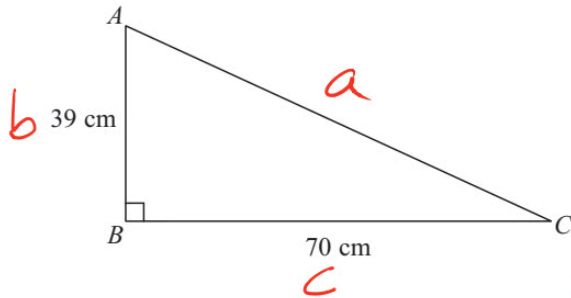


Diagram **NOT** accurately drawn

Work out the length of AC.
Give your answer correct to 1 decimal place.

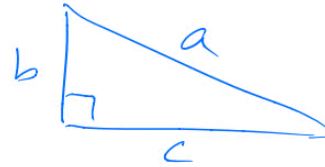
$$a^2 = b^2 + c^2$$

$$AC^2 = 39^2 + 70^2$$

$$AC = \sqrt{39^2 + 70^2}$$

$$= \underline{\underline{80.1 \text{ cm}}}$$

PYTHAGORAS THEOREM

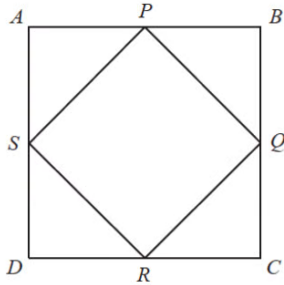


$$a^2 = b^2 + c^2$$



Answer 5

A square $ABCD$, of side 8 cm, has another square, $PQRS$, drawn inside it. P, Q, R and S are at the midpoints of each side of the square $ABCD$, as shown in the diagram.



NOT TO
SCALE

(a) Calculate the length of PQ .

Since P and Q are the mid-points of AB and BC , respectively.

$$\text{Therefore, } PB = BQ = \frac{8 \text{ cm}}{2}$$

$$PB = BQ = 4 \text{ cm}$$

In the right-angled triangle PBQ , PQ represents the hypotenuse.

Using Pythagoras' Theorem, we can work out the length of PQ .

$$PQ^2 = PB^2 + QB^2$$

$$PQ^2 = 4^2 + 4^2 \text{ cm}^2$$

$$PQ^2 = 32 \text{ cm}^2$$

$$PQ = 5.66 \text{ cm}$$



Answer 6

Here is a rectangle.

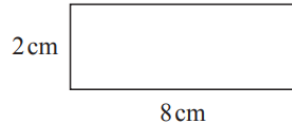


Diagram NOT accurately drawn

"EXACTLY THE SAME"

The 8-sided shape below is made from 4 of these rectangles and 4 congruent right-angled triangles.

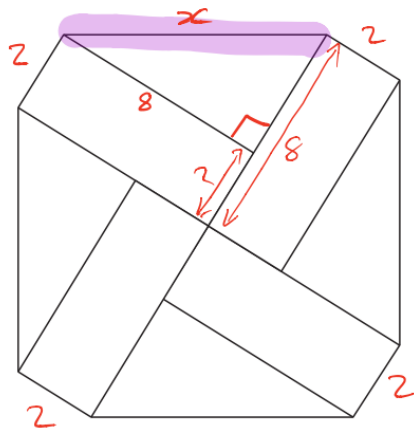
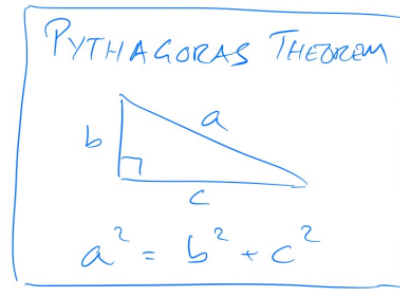
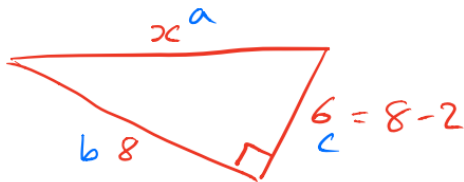


Diagram NOT accurately drawn



Work out the perimeter of the 8-sided shape.
You must show all your working.



Pyth:

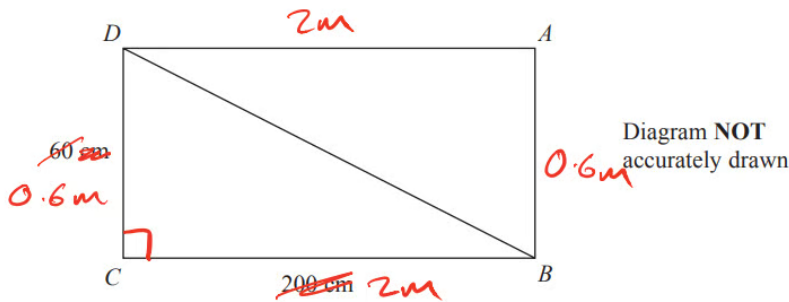
$$\begin{aligned} a^2 &= b^2 + c^2 \\ x^2 &= 8^2 + 6^2 \\ x^2 &= 64 + 36 \\ x^2 &= 100 \\ x &= 10 \end{aligned}$$

$$\begin{aligned} P &= 4 \times 2 + 4 \times 10 \\ &= 8 + 40 \\ &= \underline{\underline{48 \text{ cm}}} \end{aligned}$$



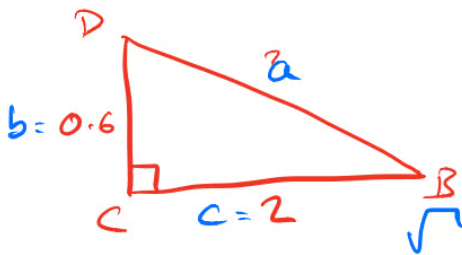
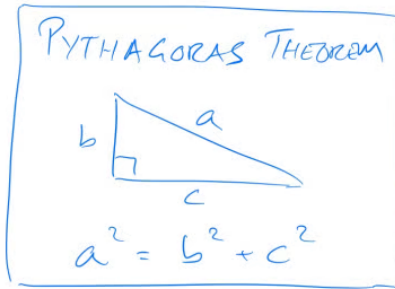
Answer 7

The diagram shows a rectangular framework.



The framework is made from 5 metal rods.
The metal rods have a weight of 0.9 kg per metre.

Work out the total weight of the framework.
Give your answer, in kg, correct to 3 significant figures.



PYTH:

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

$$a^2 = 0.6^2 + 2^2$$

$$a = \sqrt{0.6^2 + 2^2}$$

$$a = \underline{2.088\dots} \quad (\text{IN ANS MEMORY})$$

$$\text{TOTAL LENGTH} = 2 \times 0.6 + 2 \times 2 + 2.088 \quad \boxed{\text{Ans}}$$

$$\text{TOTAL WEIGHT} = 0.9 \times (2 \times 0.6 + 2 \times 2 + 2.088)$$

$$= 6.559255\dots$$

↓
≥5
Round Up

$$= \underline{\underline{6.56 \text{ kg}}}$$



Answer 8

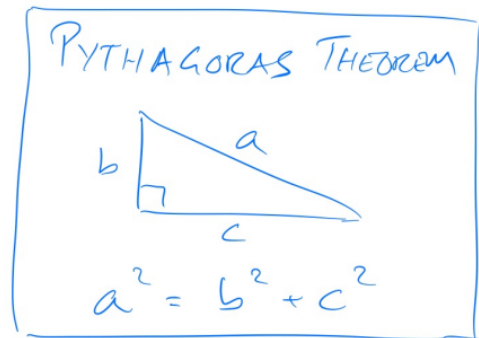
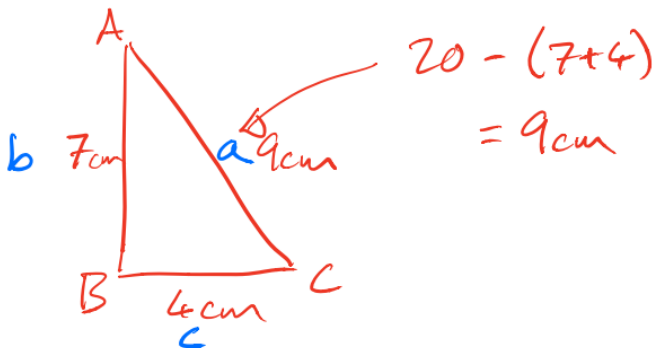
Triangle ABC has perimeter 20 cm.

$AB = 7$ cm.

$BC = 4$ cm.

By calculation, deduce whether triangle ABC is a right-angled triangle.

Draw It!



IF ABC IS RIGHT ANGLED, AC IS THE HYPOTENUSE AND $a^2 = b^2 + c^2$

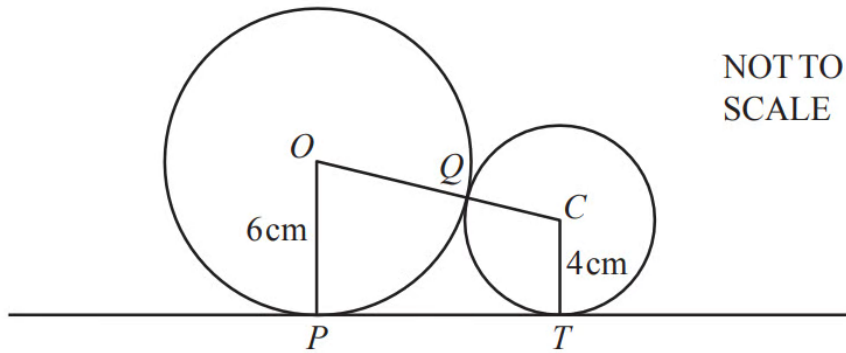
$$a^2 = 9^2 = \underline{81}$$

$$b^2 + c^2 = 7^2 + 4^2 = 49 + 16 = \underline{65}$$

SINCE $a^2 \neq b^2 + c^2$ ($81 \neq 65$) THE TRIANGLE IS NOT RIGHT ANGLED



Answer 9



Two circles, centres O and C , of radius 6 cm and 4 cm respectively, touch at Q . PT is a tangent to both circles.

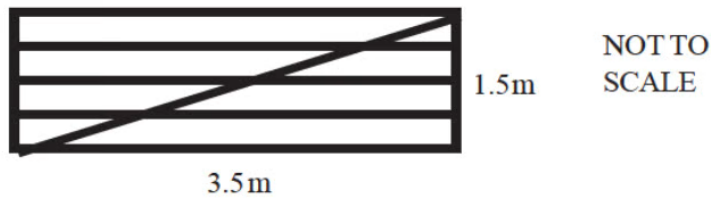
(a) Write down the distance OC .

$$6 + 4$$

$$= 10$$



Answer 10



The diagram represents a rectangular gate measuring 1.5m by 3.5m.
It is made from eight lengths of wood.
Calculate the total length of wood needed to make the gate.

We need 5 times the length of the rectangle plus 2 times
the height plus the hypotenuse of the triangle.

We find the hypotenuse using Pythagoras'

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

$$\rightarrow c^2 = 3.5^2 + 1.5^2$$

$$= 14.5$$

$$\rightarrow c = 3.8$$

Hence

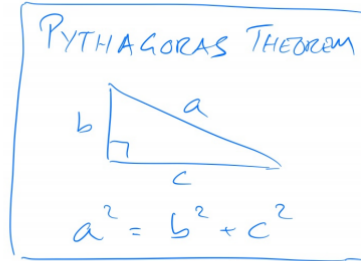
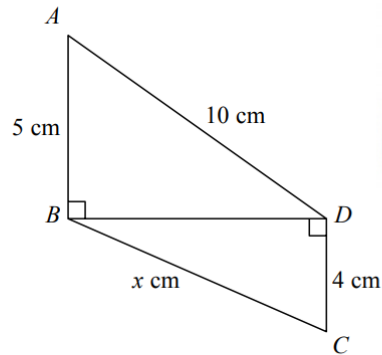
$$5 \times 3.5 + 2 \times 1.5 + 3.8$$

$$= 24.3$$

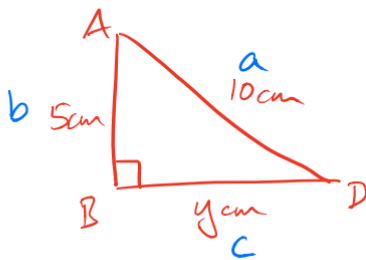


Answer 11

Triangles ABD and BCD are right-angled triangles.



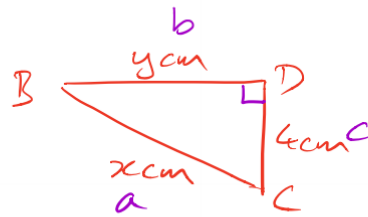
Work out the value of x .
Give your answer correct to 2 decimal places.



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

$$10^2 = 5^2 + y^2$$

$$10^2 - 5^2 = y^2$$



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

$$x^2 = y^2 + 4^2$$

$$x^2 = 10^2 - 5^2 + 4^2$$

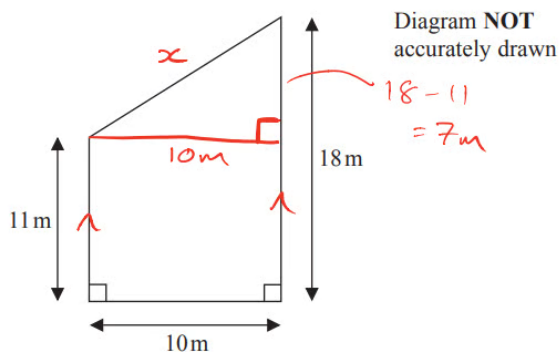
$$x = \sqrt{10^2 - 5^2 + 4^2}$$

$$= \underline{\underline{9.54}}$$



Answer 12

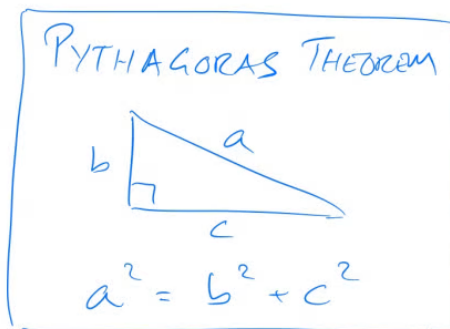
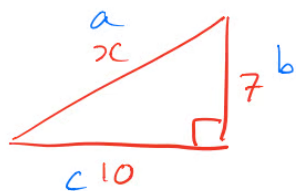
Here is part of a field.



This part of the field is in the shape of a trapezium.
A farmer wants to put a fence all the way around the edge of this part of the field.

The farmer has 50m of fence.

Does he have enough fence?
You must show all your working.



$$\begin{aligned} \text{PYTH: } a^2 &= b^2 + c^2 \\ x^2 &= 7^2 + 10^2 \\ \checkmark \quad x &= \sqrt{7^2 + 10^2} \end{aligned}$$

$$\begin{aligned} P &= 11 + 10 + 18 + \sqrt{7^2 + 10^2} \\ &= 51.20 \dots \text{m} \end{aligned}$$

No, since $51.2 > 50$,
HE DOESN'T ENOUGH FENCE.

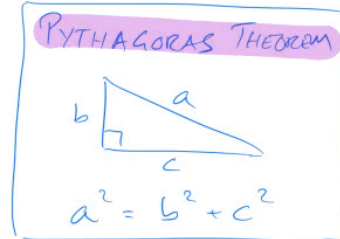
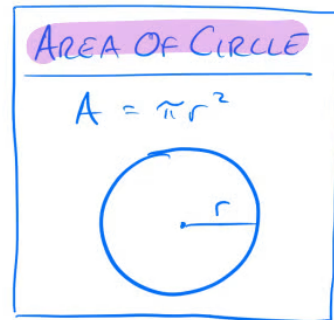
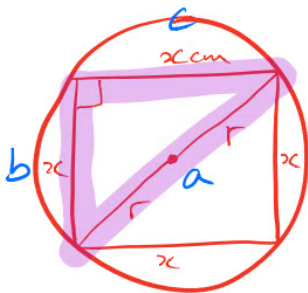


Answer 13

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 .

DRAW IT!

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



FIND r

$$\text{AREA} = \pi r^2$$

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

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

$$r = \sqrt{\frac{49}{\pi}}$$

PYTHAGORAS:

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

$$(2r)^2 = x^2 + x^2$$

$$4r^2 = 2x^2$$

$$2x^2 = 2r^2$$

$$x^2 = 2 \times \frac{49}{\pi}$$

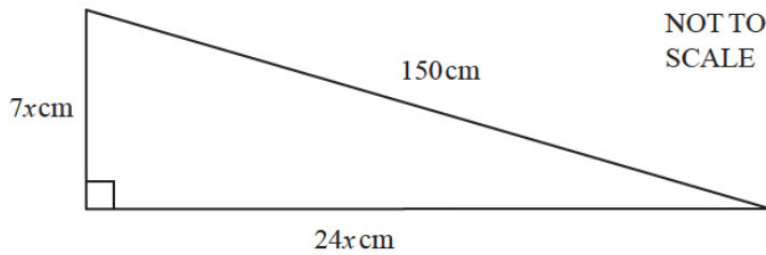
$$x = \sqrt{\frac{2 \times 49}{\pi}}$$

$$x = 5.58519 \dots$$

$$x = \underline{\underline{5.59 \text{ cm}}}$$



Answer 14



The right-angled triangle in the diagram has sides of length $7x$ cm, $24x$ cm and 150 cm.

(a) Show that $x^2 = 36$.

Using Pythagoras' Theorem, we obtain:

$$(7x)^2 + (24x)^2 = 150^2$$

$$49x^2 + 576x^2 = 22500$$

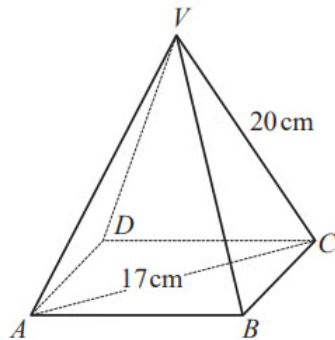
$$625x^2 = 22500$$

$$x^2 = 36$$



Answer 15

The diagram shows a pyramid with a square base $ABCD$.
All the sloping edges of the pyramid are 20 cm long and $AC = 17$ cm.



NOT TO
SCALE

Calculate the height of the pyramid.

We can draw a right-angled triangle from the very top of the pyramid to the base. This cuts the diagonal across the base in half. The triangle therefore looks like this:

Using Pythagorus, we can find the height:

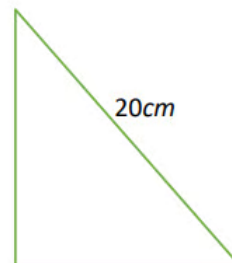
$$a^2 = b^2 + c^2$$

$$20^2 = 8.5^2 + h^2$$

$$h^2 = 20^2 - 8.5^2$$

$$h = \sqrt{20^2 - 8.5^2}$$

Height= h



$$\frac{17}{2} = 8.5$$

We can plug this into our calculator: $h = 18.1038 \dots$

$$h = 18.1 \text{ cm (3. s. f)}$$