EXAM PAPERS PRACTICE

GCSE Edexcel Math
1MA1
Pythagoras

Answers

"We will help you to achieve A Star "

Answer 1

XYZ is a right-angled triangle.

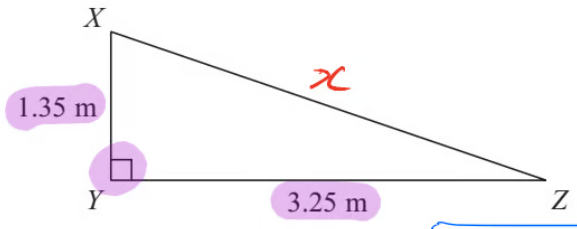


Diagram **NOT** accurately drawn

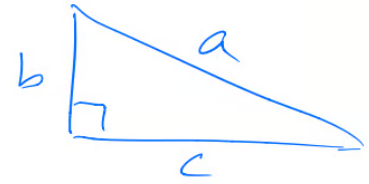
Calculate the length of *XZ*.
Give your answer correct to 3 significant figures.

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

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

$= 3.52\text{ m}$

PYTHAGORAS THEOREM



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

Answer 2

Here is a right-angled triangle.

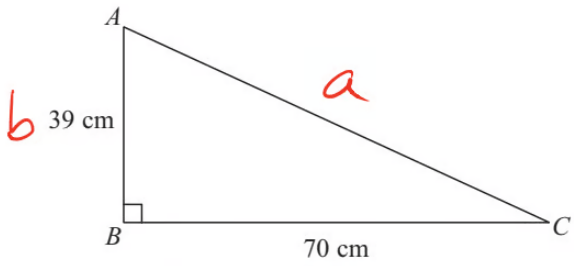


Diagram **NOT** accurately drawn

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

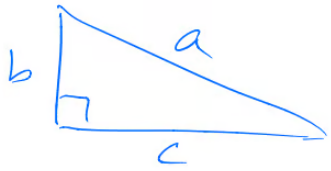
$a^2 = b^2 + c^2$

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

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

$= 80.1 \text{ cm}$

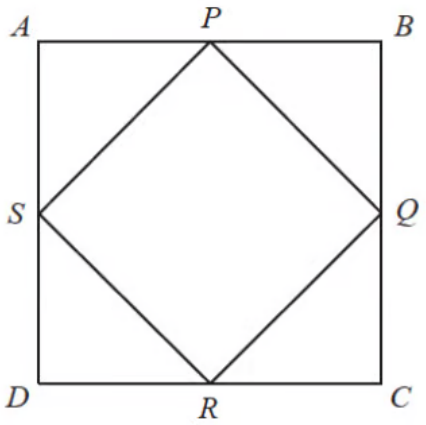
PYTHAGORAS THEOREM



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

Answer 3

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.

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

PB = BQ = 4 cm

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

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 cm

Answer 4

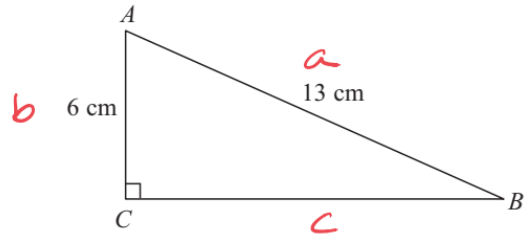
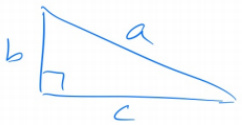


Diagram **NOT** accurately drawn

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.

PYTHAGORAS THEOREM



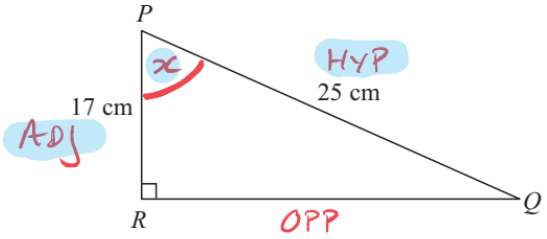
$a^2 = b^2 + c^2$

$13^2 = 6^2 + c^2$

$-6^2 \quad -6^2$

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

SQ.RT. $c = \sqrt{13^2 - 6^2} = 11.5\text{cm}$



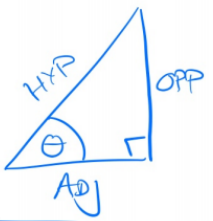
PQR is a right-angled triangle.
PR = 17 cm
PQ = 25 cm

SOHCAHTOA

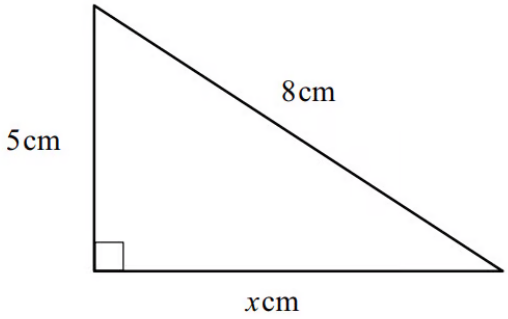
$\sin\theta = \frac{OPP}{HYP}$

$\cos\theta = \frac{ADJ}{HYP}$

$\tan\theta = \frac{OPP}{ADJ}$



Answer 5



NOT TO SCALE

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.

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

$$64 = 25 + x^2$$

Subtract 25 from both sides of the equation.

$$39 = x^2$$

Take the positive root.

$$\boldsymbol{x = 6.24}$$

Answer 6

Here is a rectangle.

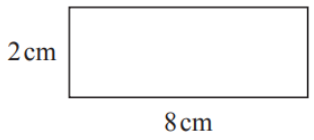


Diagram **NOT** accurately drawn

"EXACTLY THE SAME"

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

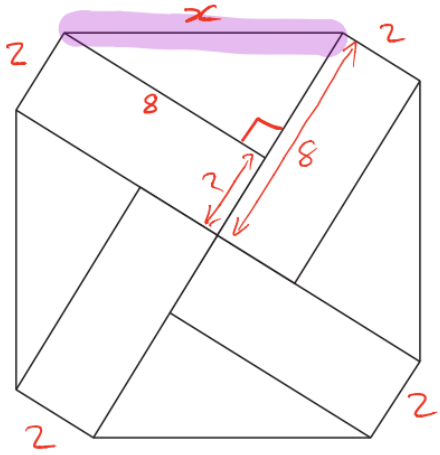
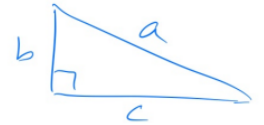


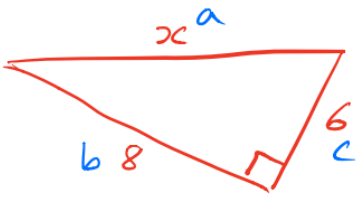
Diagram **NOT** accurately drawn

PYTHAGORAS THEOREM



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

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



$6 = 8 - 2$

PYTH:

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

$x^2 = 8^2 + 6^2$

$x^2 = 64 + 36$

$x^2 = 100$

$x = 10$

$P = 4 \times 2 + 4 \times 10$

$= 8 + 40$

$= 48$ cm

Answer 7

The diagram shows a rectangular framework.

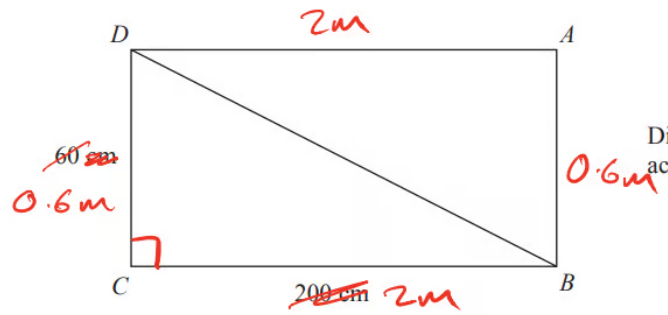
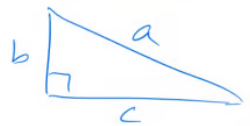


Diagram **NOT** accurately drawn

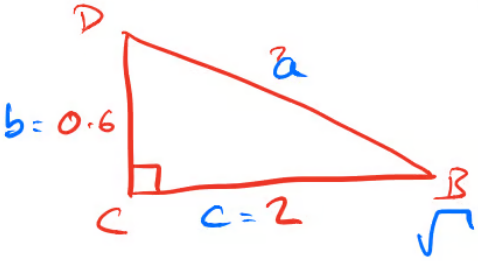
The framework is made from 5 metal rods.
The metal rods have a weight of 0.9 kg per metre.

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

PYTHAGORAS THEOREM



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



PYTH:

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

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

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

$a = 2.088\ldots$ (IN ANS MEMORY)

TOTAL LENGTH $= 2 \times 0.6 + 2 \times 2 + 2.088$ (Ans)

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

$= 6.559255\ldots$

≥ 5 ROUND UP

$= 6.56$ kg

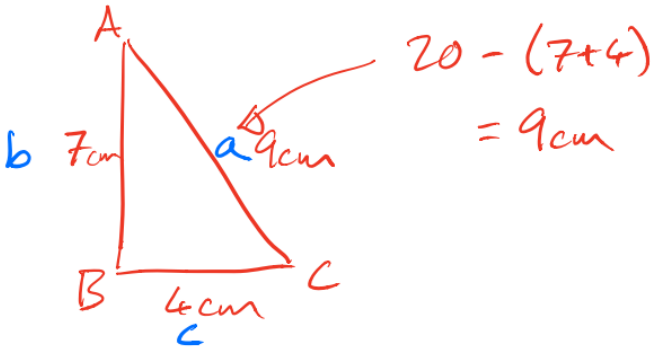
Answer 8

Triangle ABC has perimeter 20 cm.

$AB = 7$ cm.
$BC = 4$ cm.

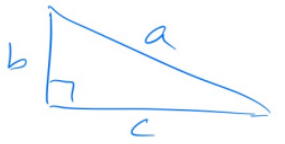
By calculation, deduce whether triangle ABC is a right-angled triangle.

DRAW IT!



$20 - (7+4)$
$= 9\text{cm}$

PYTHAGORAS THEOREM



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

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

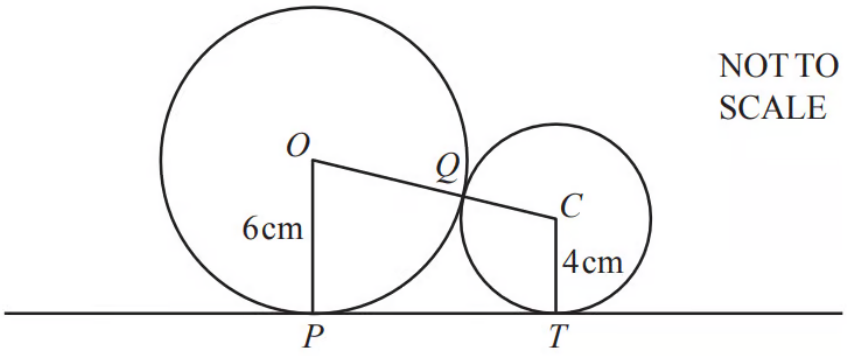
$a^2 = 9^2 = 81$

$b^2 + c^2 = 7^2 + 4^2 = 49 + 16$

$= 65$

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.

$6 + 4$

$= \mathbf{10}$

Answer 10

Here is part of a field.

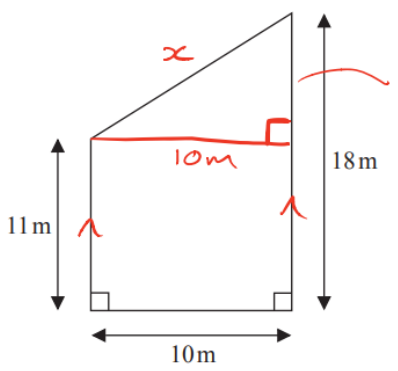


Diagram **NOT** accurately drawn

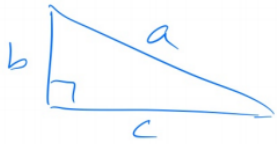
18 − 11 = 7m

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.

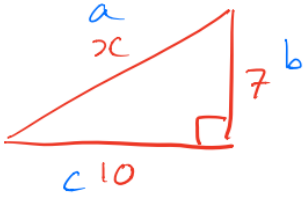
The farmer has 50m of fence.

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

PYTHAGORAS THEOREM



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



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

$x^2 = 7^2 + 10^2$

$x = \sqrt{7^2 + 10^2}$

$P = 11 + 10 + 18 + \sqrt{7^2 + 10^2}$

$= 51.20\ldots$ m

NO, SINCE $51.2 > 50$,

HE DOESN'T ENOUGH FENCE.

Answer 11

ABCD is a trapezium.

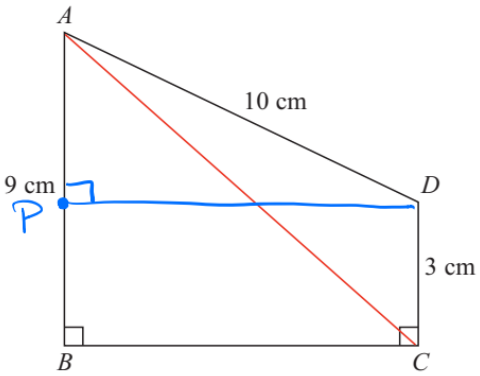
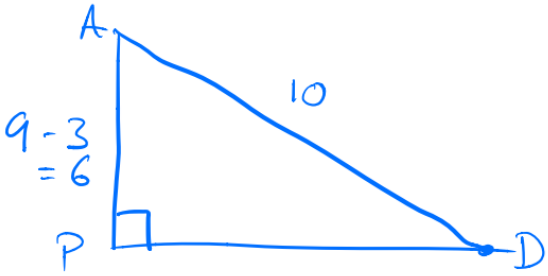


Diagram **NOT** accurately drawn

PD = BC

$AD = 10$ cm
$AB = 9$ cm
$DC = 3$ cm
Angle ABC = angle $BCD = 90°$

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



PYTH

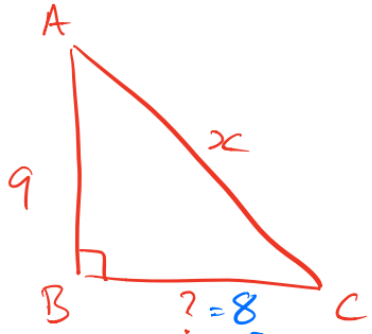
$10^2 = 6^2 + ?^2$

$?^2 = 10^2 - 6^2$

$= 100 - 36$

$?^2 = 64$

$? = 8$



PYTHAGORAS' THM

$x^2 = 9^2 + 8^2$

$x^2 = 81 + 64$

$x^2 = 145$

$x = \sqrt{145} = 12.0$ cm

Answer 12

Here is the quadrilateral $ABCD$.

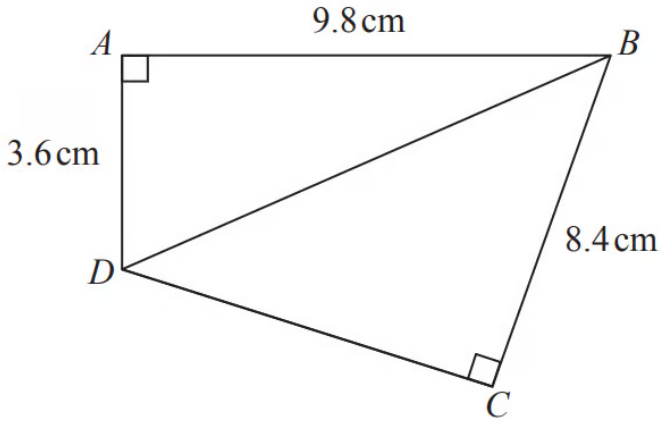


Diagram **NOT** accurately drawn

Angle $BAD = 90°$ and angle $BCD = 90°$
$AB = 9.8\,\text{cm}$
$AD = 3.6\,\text{cm}$
$BC = 8.4\,\text{cm}$

Calculate the length of DC.

Using Pythagoras :

$DB^2 = 9.8^2 + 3.6^2 = 109$

$DC^2 = DB^2 - BC^2$

$DC = \sqrt{109 - 8.4^2}$

$DC = 6.2$ cm

Answer 13

(b) Calculate the perimeter of the triangle.

From a), we obtain that:

$x = \pm 6$

The side of a triangle is positive value:

$x = 6$

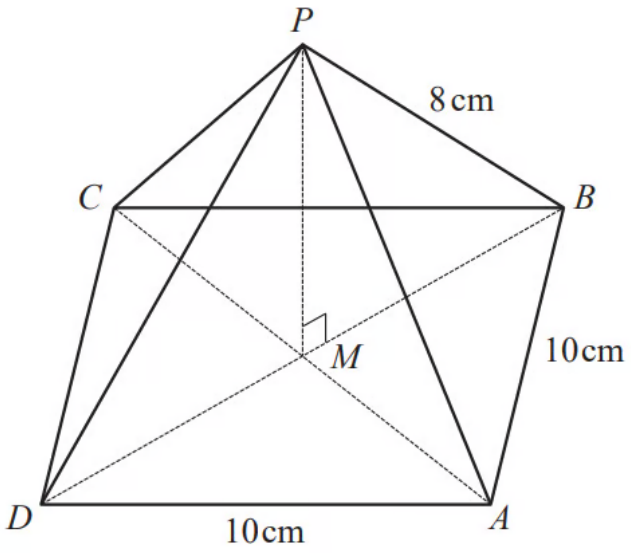
The perimeter represents the sum of all the sides.

$P = 7x + 24x + 150$ cm

$P = 31 \times 6 + 150$

P = 336 cm

Answer 14



NOT TO SCALE

The diagram represents a pyramid with a square base of side 10 cm.

The diagonals AC and BD meet at M. P is vertically above M and $PB = 8$cm.

(a) Calculate the length of BD.

We can use Pythagoras' whilst considering triangle DBA to find

$$DB^2 = 10^2 + 10^2$$

$$= 200$$

$$\rightarrow DB = 10\sqrt{2}$$

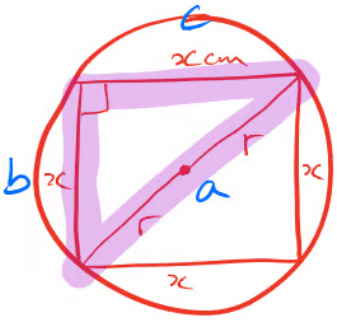
$$= \mathbf{14.1}$$

Answer 15

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.

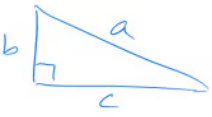
DRAW IT!



AREA OF CIRCLE

$A = \pi r^2$

PYTHAGORAS THEOREM



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

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:

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

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

$4r^2 = 2x^2$

$x^2 = 2r^2$

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

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

$x = 5.588\,19\ldots$

$x = 5.59$ cm