Solutions by
Kenneth Stafford
MATHS TUTOR
ken@kennethstafford.co.uk

GCSE (9-1) Grade 4 Pythagoras Theorem



Instructions

Use **black** ink or ball-point pen.
Fill in the boxes at the top of this page with your name.
Answer **all** questions.
Answer the questions in the spaces provided
- there may be more space than you need.

Show all your working out

Information

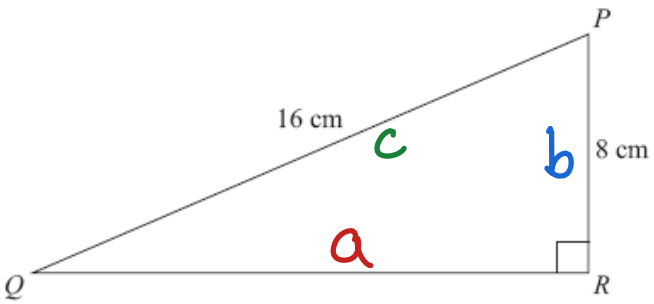
The marks for **each** question are shown in brackets.
Use this as a guide as to how much time to spend on each question.
Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed

Advice

Read each question carefully before you start to answer it
Attempt every question
Check your answers if you have time at the end

1.

Diagram **NOT** accurately drawn



PQR is a right-angled triangle.
PQ = 16 cm.
PR = 8 cm.

Calculate the length of *QR*.
Give your answer correct to 2 decimal places.

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

$a^2 + 8^2 = 16^2$

$a^2 + 64 = 256$

$a^2 = 256 - 64$

$a^2 = 192$

$a = \sqrt{192}$

$a = 13.8564$

13.86 ..... cm

(3 marks)

2.

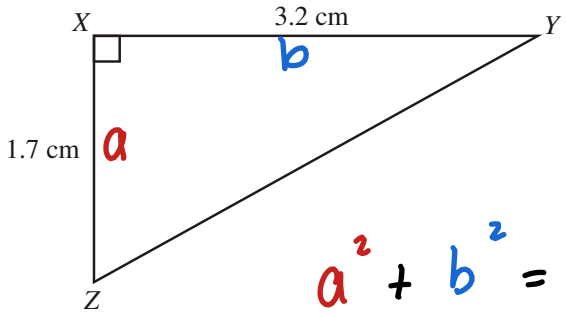


Diagram **NOT** accurately drawn

XYZ is a right-angled triangle.
XY = 3.2 cm.
XZ = 1.7 cm.

Calculate the length of *YZ*.

Give your answer correct to 3 significant figures.

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

$1.7^2 + 3.2^2 = c^2$

$2.89 + 10.24 = c^2$

$13.13 = c^2$

$c = \sqrt{13.13}$

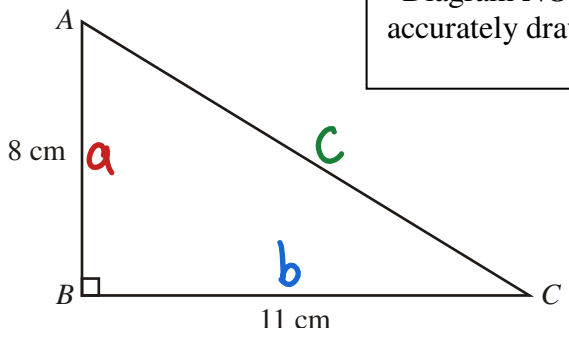
$c = 3.6235$

3.62 ..... cm

(3 marks)

3.

Diagram **NOT** accurately drawn



ABC is a right-angled triangle.

AB = 8 cm,
BC = 11 cm.

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

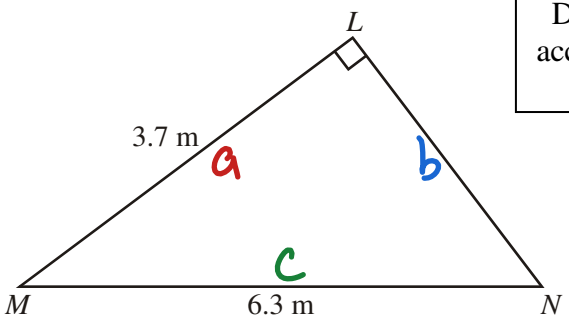
$a^2 + b^2 = c^2$
$8^2 + 11^2 = c^2$
$64 + 121 = c^2$
$185 = c^2$
$c = \sqrt{185} = 13.60147$

13.6 ..... cm

(3 marks)

4.

Diagram **NOT** accurately drawn



Angle *MLN* = 90°.
LM = 3.7 m.
MN = 6.3 m.

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

$b^2 = c^2 - a^2$
$b^2 = 6.3^2 - 3.7^2$
$b^2 = 39.69 - 13.69$
$b^2 = 26$
$b = \sqrt{26} = 5.0990$

LN = 5.10 ..... m

(3 marks)

5.

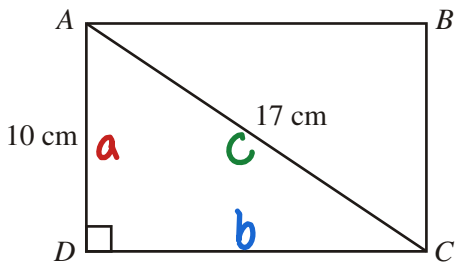


Diagram **NOT** accurately drawn

$b^2 = c^2 - a^2$

$b^2 = 17^2 - 10^2$

$b^2 = 289 - 100$

$b^2 = 189$

$b = \sqrt{189} = 13.7477$

ABCD is a rectangle.
AC = 17 cm.
AD = 10 cm.

Calculate the length of the side *CD*.
Give your answer correct to one decimal place.

13.7 ..... cm

(3 marks)

6.

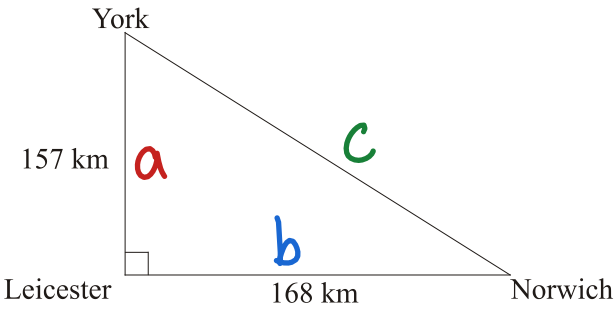


Diagram **NOT** accurately drawn

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

$157^2 + 168^2 = c^2$

$24649 + 28224 = c^2$

$c^2 = 52873$

$c = 229.941$

The diagram shows three cities.
Norwich is 168 km due East of Leicester.
York is 157 km due North of Leicester.

Calculate the distance between Norwich and York.
Give your answer correct to the nearest kilometre.

230 ..... km

(3 marks)

7.

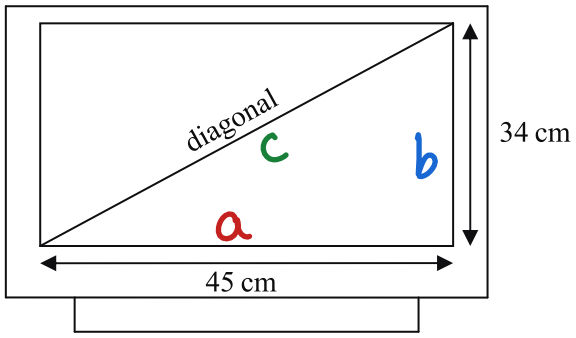


Diagram **NOT** accurately drawn

A rectangular television screen has a width of 45 cm and a height of 34 cm.

Work out the length of the diagonal of the screen.
Give your answer correct to the nearest centimetre.

$a^2 + b^2 = c^2$
$45^2 + 34^2 = c^2$
$2025 + 1156 = c^2$
$c^2 = 3181$
$c = 56.400$

56 ..... cm

(4 marks)

8.

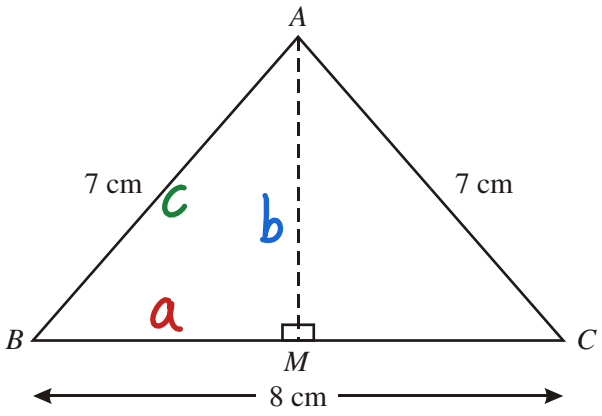


Diagram **NOT** accurately drawn

$b^2 = c^2 - a^2$
$b^2 = 7^2 - 4^2$
$b^2 = 49 - 16$
$b^2 = 33$
$b = \sqrt{33} = 5.74456$

Work out the length, in centimetres, of AM.
Give your answer correct to 2 decimal places.

5.74 ..... cm

(3 marks)

9.

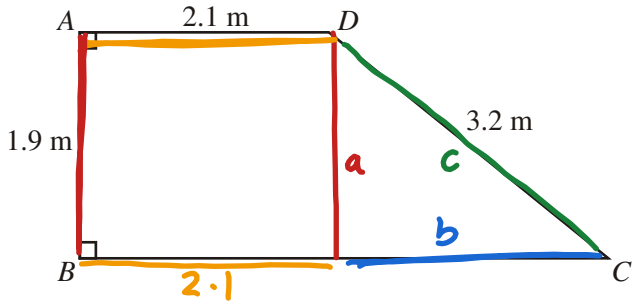


Diagram **NOT** accurately drawn

ABCD is a trapezium.
AD is parallel to *BC*.
Angle *A* = angle *B* = 90.
AD = 2.1 m, *AB* = 1.9 m, *CD* = 3.2 m.

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

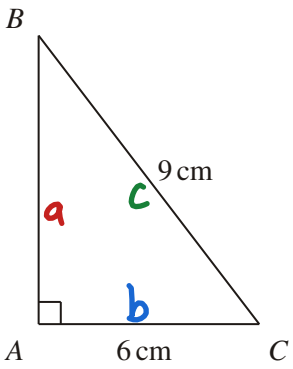
$b^2 = c^2 - a^2$
$b^2 = 3.2^2 - 1.9^2$
$b^2 = 10.24 - 3.61$
$b^2 = 6.63$
$b = \sqrt{6.63} = 2.57487$

$2.1 + 2.57 = 4.67$

..... m

(4 marks)

10.



$a^2 = c^2 - b^2$
$a^2 = 9^2 - 6^2$
$a^2 = 81 - 36$
$a^2 = 45$
$a = \sqrt{45} = 6.7082$

Diagram **NOT** accurately drawn

ABC is a right-angled triangle.

AC = 6 cm.
BC = 9 cm.

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

6.71 ..... cm

(3 marks)

11.

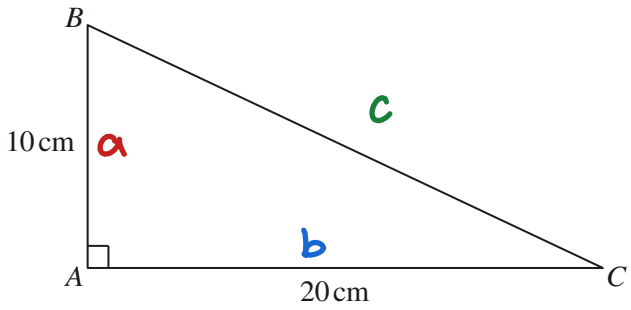


Diagram **NOT** accurately drawn

In triangle ABC,

$AB = 10$ cm
$AC = 20$ cm
angle $BAC = 90°$

$c^2 = a^2 + b^2$
$c^2 = 10^2 + 20^2$
$c^2 = 100 + 400$
$c = 500$
$c = \sqrt{500} = 22.36067$

Work out the length of BC.
Give your answer correct to 3 significant figures.
You must state the units in your answer.

22.4 cm

(4 marks)

12.

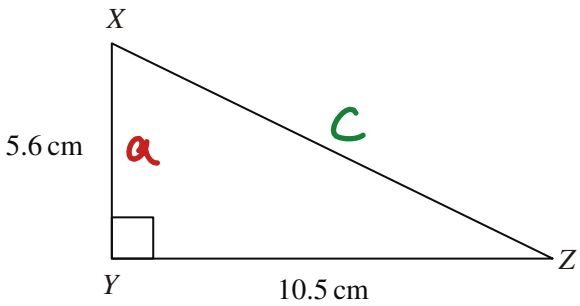


Diagram **NOT** accurately drawn

$c^2 = a^2 + b^2$
$c^2 = 5.6^2 + 10.5^2$
$c^2 = 31.36 + 110.25$
$c^2 = 141.61$
$c = \sqrt{141.61} = 11.9$

In the triangle XYZ

$XY = 5.6$ cm

$YZ = 10.5$ cm

angle $XYZ = 90$

Work out the length of XZ.

..... cm

(3 marks)

---

13. *ABCD* is a trapezium.

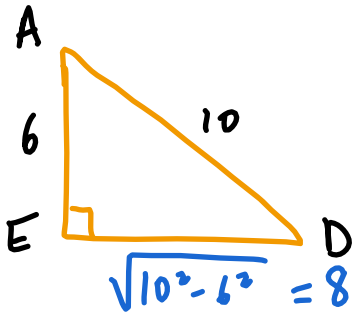
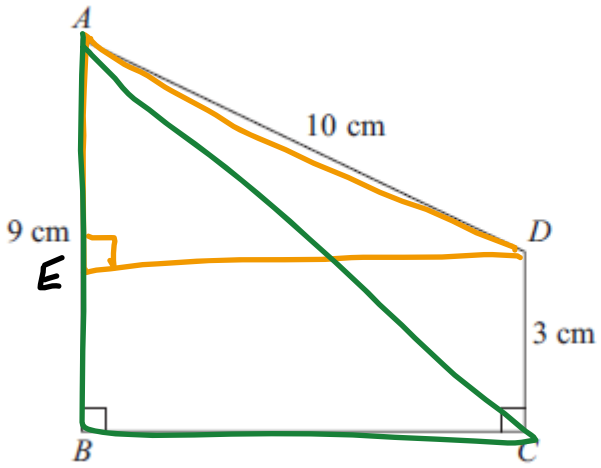
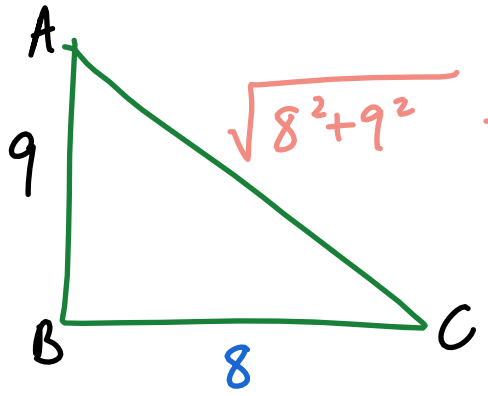


Diagram **NOT** accurately drawn



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.



$\sqrt{8^2+9^2} = \sqrt{145}$
$= 12.04159$

12.0 ..... cm

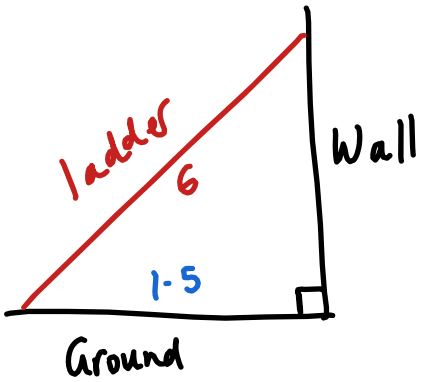
(5 marks)

---

14. A ladder is 6 m long.
The ladder is placed on horizontal ground, resting against a vertical wall.

The instructions for using the ladder say that the bottom of the ladder must **not** be closer than 1.5 m from the bottom of the wall.

How far up the wall can the ladder reach?
Give your answer correct to 1 decimal place.



$\sqrt{6^2-1.5^2}$
$\sqrt{33.75} = 5.809$

5.8 ..... m

(4 marks)
