



- 1 Triangle DEF is a right-angled triangle with the right angle at E.
The hypotenuse DF = 20 cm and DE = 8 cm.
Work out the length of EF.
Give your answer correct to 1 decimal place.

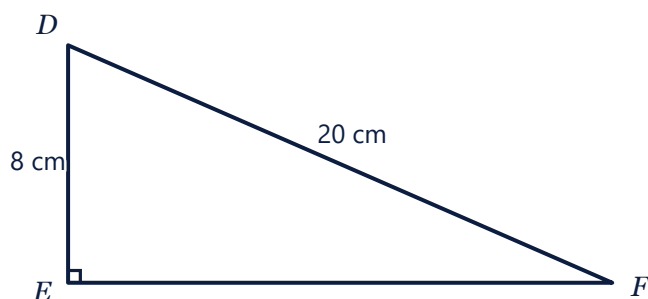


Diagram NOT accurately drawn

(2 marks)

EF is a shorter side, so rearrange Pythagoras' theorem

$$EF^2 = DF^2 - DE^2$$

$$EF^2 = 20^2 - 8^2 = 400 - 64 = 336$$

$$EF = \sqrt{336} = 18.330... = 18.3 \text{ cm (1 decimal place)}$$

$$\boxed{18.3 \text{ cm}}$$

- 2 Triangle PQR has a right angle at Q. PR = 17 cm and PQ = 8 cm.
Work out the length of QR.

(2 marks)

PR is the hypotenuse

$$PQ^2 + QR^2 = PR^2$$

$$8^2 + QR^2 = 17^2$$

$$64 + QR^2 = 289$$

-64

$$QR^2 = 225$$

-64

$$QR = \sqrt{225}$$

$$\boxed{QR = 15 \text{ cm}}$$

- 3 A rectangular screen has a diagonal of 15 inches and a width of 9 inches.
Work out the height of the screen.

(3 marks)

the diagonal is the hypotenuse

$$\begin{array}{rcl} 9^2 + h^2 & = & 15^2 \\ 81 + h^2 & = & 225 \\ -81 & & -81 \\ h^2 & = & 144 \\ h & = & \sqrt{144} \end{array}$$

$$h = 12 \text{ inches}$$

- 4 A kite is flying on a straight string that is 45 m long. The kite is 28 m horizontally from the person holding the other end of the string. The person holds the string at ground level.
Work out the height of the kite above the ground. Give your answer correct to 1 decimal place.

(3 marks)

string is the hypotenuse

$$\begin{array}{rcl} h^2 + 28^2 & = & 45^2 \\ h^2 + 784 & = & 2025 \\ -784 & & -784 \\ h^2 & = & 1241 \\ h & = & \sqrt{1241} \\ & = & 35.22... \end{array}$$

$$h = 35.2 \text{ m}$$

- 5 A straight wheelchair ramp is 3.4 m long. It starts 3.2 m horizontally from the base of a platform and reaches the top of the platform.
Work out the height of the platform. Give your answer in metres, correct to 2 decimal places.

(3 marks)

ramp is the hypotenuse

$$\begin{array}{rcl} h^2 + 3.2^2 & = & 3.4^2 \\ h^2 + 10.24 & = & 11.56 \\ -10.24 & & -10.24 \\ h^2 & = & 1.32 \\ h & = & \sqrt{1.32} \\ & = & 1.1489... \end{array}$$

$$h = 1.15 \text{ m}$$

6

Triangle ABC has a right angle at B . $AC = 9$ cm and $AB = 6$ cm.

Work out the length of BC . Give your answer as a surd in its simplest form.

(3 marks)

AC is the hypotenuse

$$\begin{array}{rcl}
 6^2 + BC^2 & = & 9^2 \\
 36 + BC^2 & = & 81 \\
 -36 & & -36 \\
 BC^2 & = & 45 \\
 BC & = & \sqrt{45} \\
 & = & \sqrt{9 \times 5}
 \end{array}$$

$$BC = 3\sqrt{5} \text{ cm}$$

7

An isosceles triangle has two equal sides of length 9 cm and a base of length 10 cm.

a. Work out the perpendicular height of the triangle. Give your answer correct to 1 decimal place.

b. Work out the area of the triangle. Give your answer correct to 1 decimal place.

(4 marks)

a)

height splits the base: half of 10 = 5

$$\begin{array}{rcl}
 h^2 + 5^2 & = & 9^2 \\
 h^2 + 25 & = & 81 \\
 -25 & & -25 \\
 h^2 & = & 56 \\
 h & = & \sqrt{56} \\
 & = & 7.483...
 \end{array}$$

b)

$$\text{area} = \frac{1}{2} \times 10 \times 7.483...$$

$$= 37.41...$$

$$\boxed{\text{a) } 7.5 \text{ cm b) } 37.4 \text{ cm}^2}$$

8

A ladder is 6.5 m long.

The ladder leans against a vertical wall, with the foot of the ladder on horizontal ground 2.5 m from the base of the wall.

Work out how far up the wall the top of the ladder reaches.

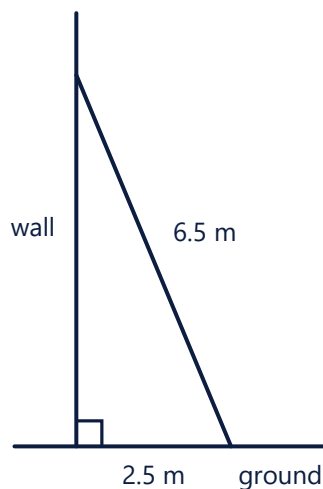


Diagram NOT accurately drawn

(3 marks)

The ladder, the wall and the ground form a right-angled triangle with the ladder as the hypotenuse

$$\text{height}^2 = 6.5^2 - 2.5^2 = 42.25 - 6.25 = 36$$

$$\text{height} = \sqrt{36} = 6 \text{ m}$$

6 m

9

$ABCD$ is a trapezium. AB is parallel to DC . The angles at A and D are both 90° .

$AB = 9$ cm, $DC = 14$ cm and $BC = 13$ cm.

Work out the area of the trapezium.

(4 marks)

drop a line from B to E on DC

$$OE = AB = 9$$

$$EC = 14 - 9 = 5$$

$$BE^2 + 5^2 = 13^2$$

$$BE^2 + 25 = 169$$

-25

$$BE^2 = 144$$

-25

$$BE = 12$$

$$\text{area} = \frac{1}{2} \times (9 + 14) \times 12$$

$$= 138$$

$$138 \text{ cm}^2$$