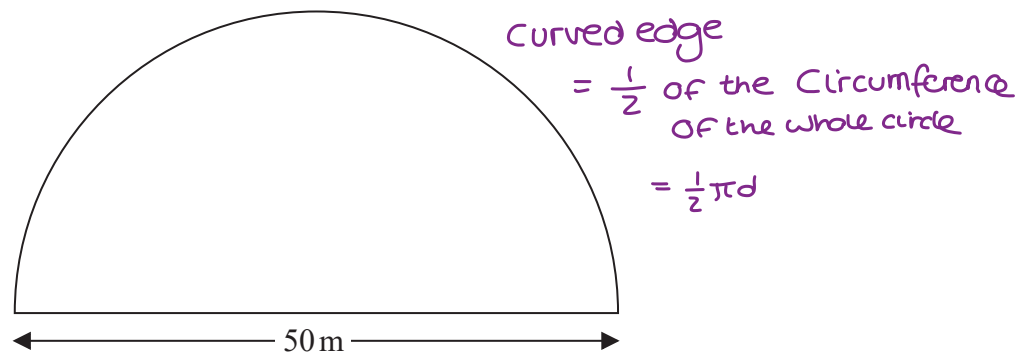


1. A farmer has a field in the shape of a semicircle of diameter 50 m.



The farmer asks Jim to build a fence around the edge of the field.
 Jim tells him how much it will cost.

Total cost = £29.86 per metre of fence plus £180 for each day's work

Jim takes three days to build the fence.

Work out the total cost.

Whole circle
 Circumference: $\pi d = \pi \times 50$
 $= 50\pi \text{ m}$ (1)

Curved edge: $\frac{1}{2} \times 50\pi = 25\pi \text{ m}$

Semicircle perimeter: $= 25\pi + 50$
 $= 128.54 \text{ m}$ (1)

Fence cost: length (m) \times cost per m
 $128.54 \text{ m} \times \text{£}29.86 = \text{£}3838.20$

Work cost: days \times cost per day
 $3 \times \text{£}180 = \text{£}540$ (1)

Total cost: fence cost + work cost
 $= \text{£}3838.20 + \text{£}540$ (1)
 $= \text{£}4378.20$ £ 4,378.20 (1)

(Total for Question is 5 marks)

2. Maisie knows that she needs 3 kg of grass seed to make a rectangular lawn 5 m by 9 m.

Grass seed is sold in 2 kg boxes.

Maisie wants to make a rectangular lawn 10 m by 14 m.

She has 5 boxes of grass seed.

- (a) Has Maisie got enough grass seed to make a lawn 10 m by 14 m?

You must show all your working.

5
 $5 \times 9 = 45$
 9
 Covers an area of 45 m^2
 Requires 3 kg of grass seed.

10
 $10 \times 14 = 140$
 14
 Covers an area of 140 m^2
 Requires 9.3 kg of grass seed.

$45 \text{ m}^2 = 3 \text{ kg}$
 $140 \text{ m}^2 = 9.333... \text{ kg}$

$\times \frac{140}{45}$ $\times \frac{140}{45}$

Maisie has 5 boxes. How much is this in kg?

$1 \text{ box} = 2 \text{ kg}$
 $5 \text{ boxes} = 10 \text{ kg}$

Maisie has 10 kg of seed but only needs 9.3 kg.
 $10 \text{ kg} > 9.3 \text{ kg} \therefore$ Maisie has enough.

(4)

Maisie opens the 5 boxes of grass seed.

She finds that 4 of the boxes contain 2 kg of grass seed.

The other box contains 1 kg of grass seed.

- (b) Does this affect whether Maisie has enough grass seed to make her lawn?

Give a reason for your answer.

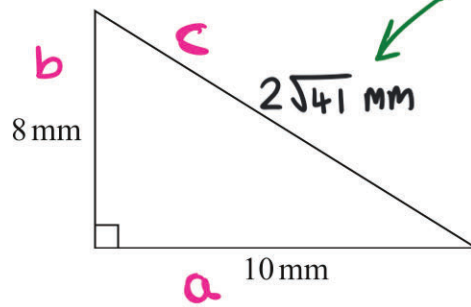
Yes. Maisie only has 9 kg of grass seed, but she needs 9.3 kg.

She no longer has enough grass seed to make her lawn.

(1)

(Total for Question is 5 marks)

3. Here is a right-angled triangle.



Using Pythagoras Theorem

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

$$10^2 + 8^2 = c^2$$

$$c^2 = 164 \quad \textcircled{1}$$

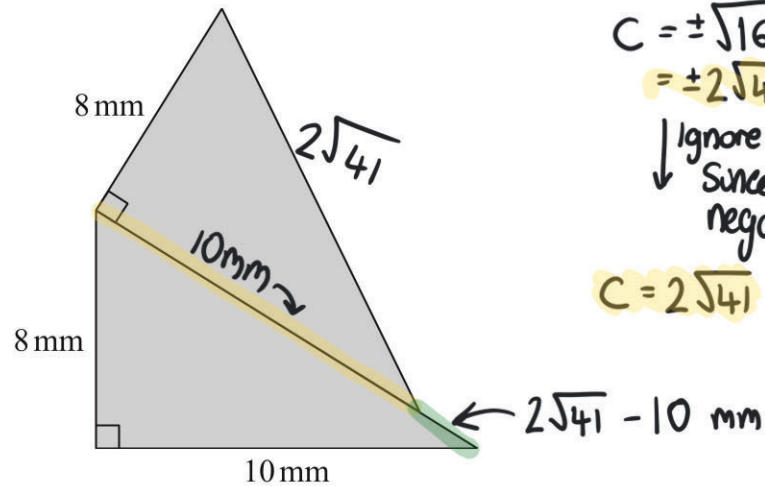
$$c = \pm \sqrt{164}$$

$$= \pm 2\sqrt{41}$$

Ignore negative
Since cannot have negative length

$$c = 2\sqrt{41} \quad \textcircled{1}$$

The shaded shape below is made from two of these triangles.



Work out the perimeter of the shaded shape.

Give your answer correct to 3 significant figures.

$$\text{Perimeter} = 10 + 8 + 8 + 2\sqrt{41} + (2\sqrt{41} - 10) = 41.61249... = 41.6 \text{ mm (3sf)}$$

41.6 mm