

I DO

A circular garden has a radius of 10.4 m.

- (a) Work out an estimate for the area of the garden.
You must show all your working.

- (b) Is your answer to part (a) an underestimate or an overestimate?
Give a reason for your answer.

WE DO

A circular mirror has a diameter of 40.3 cm.

- (a) Work out an estimate for the circumference of the mirror.
You must show all your working.

- (b) Is your answer to part (a) an underestimate or an overestimate?
Give a reason for your answer.

YOU DO

A circular pond has an area of 295 m^2 .

- (a) Work out an estimate for the radius of the pond.
You must show all your working.

- (b) Is your answer to part (a) an underestimate or an overestimate?
Give a reason for your answer.

CHALLENGE

The circumference of a circular running track is 118 m.

Work out an estimate for the area enclosed by the track.
You must show all your working.

Answers & Worked Solutions

- **I Do:**

(a) $\pi \approx 3$, $r \approx 10$ m.

$$\text{Area} = \pi \times r^2 \approx 3 \times 10^2 = 3 \times 100 = 300 \text{ m}^2.$$

(b) **Underestimate**, because both the radius (10.4 rounded down to 10) and π (3.14... rounded down to 3) were rounded down.

- **We Do:**

(a) $\pi \approx 3$, $d \approx 40$ cm.

$$\text{Circumference} = \pi \times d \approx 3 \times 40 = 120 \text{ cm}.$$

(b) **Underestimate**, because both the diameter (40.3 rounded down to 40) and π (3.14... rounded down to 3) were rounded down.

- **You Do:**

(a) $\text{Area} \approx 300 \text{ m}^2$, $\pi \approx 3$.

$$\text{Area} = \pi \times r^2 \rightarrow 300 = 3 \times r^2 \rightarrow r^2 = 100 \rightarrow r = 10 \text{ m}.$$

(b) **Overestimate**. The area was rounded up (from 295 to 300) and π was rounded down (from 3.14... to 3). Dividing a larger number by a smaller number ($r = \sqrt{A/\pi}$) gives a larger result.

- **Challenge:**

$$C \approx 120 \text{ m}, \pi \approx 3.$$

$$C = \pi \times d \rightarrow 120 = 3 \times d \rightarrow d = 40 \text{ m}.$$

$$\text{Radius } r = 40 \div 2 = 20 \text{ m}.$$

$$\text{Area} = \pi \times r^2 \approx 3 \times 20^2 = 3 \times 400 = 1200 \text{ m}^2.$$

Answer: 1200 m²