Estimating square roots and recognising pi

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. Place $\sqrt{35}$ between consecutive integers. [2 marks]

$25 < 35 < 36$.

Answer: $5 < \sqrt{35} < 6$

2. Place $\sqrt{70}$ between consecutive integers. [2 marks]

$64 < 70 < 81$.

Answer: $8 < \sqrt{70} < 9$

3. Use $3.4^2 = 11.56$ and $3.5^2 = 12.25$ to bound $\sqrt{12}$. [2 marks]

Twelve lies between the supplied squares.

Answer: $3.4 < \sqrt{12} < 3.5$

4. A circle has diameter 6 cm. Give its exact circumference, then use $\pi = 3.142$ to estimate it to two decimal places. [3 marks]

$C = 6\pi$.

Using the supplied approximation, $6 \times 3.142 = 18.852$, which rounds to 18.85.

Answer: 6π cm; 18.85 cm.

5. Explain why a measured circumference-to-diameter ratio of 3.14 does not prove π equals 3.14. [2 marks]

Pi is an exact irrational constant.

Finite measurement precision cannot establish its full value.

Answer: Measurements and the reported ratio are approximate.

6. Which is larger: $\sqrt{26}$ or 5.1? Justify without finding the root. [3 marks]

$5.1^2 = 26.01 > 26$.

Both values are positive, so $5.1 > \sqrt{26}$.

Answer: 5.1