Real numbers - Practice test 1

16 questions | 38 marks | 50 minutes

Classification, number-line order, root estimates and exact values.

Equivalent correct methods earn the corresponding marks.

1. Write -8 as a fraction to show it is rational. [2 marks]

Use denominator one.

Answer: $-\frac{8}{1}$.

2. Write 0.45 as a simplified fraction. [2 marks]

$\frac{45}{100} = \frac{9}{20}$.

Answer: $\frac{9}{20}$.

3. Is $\sqrt{64}$ rational or irrational? Explain. [2 marks]

$64 = 8^2$ and $8 = \frac{8}{1}$.

Answer: Rational; 8.

4. Is $\sqrt{15}$ rational or irrational? Explain. [2 marks]

15 is not a perfect square.

Answer: Irrational.

5. Write $0.\overline{36}$ as a simplified fraction. [3 marks]

If $x = 0.363636\ldots$, then $99x = 36$, giving $\frac{36}{99} = \frac{4}{11}$.

Answer: $\frac{4}{11}$.

6. Give consecutive integer bounds for $\sqrt{42}$. [2 marks]

$36 < 42 < 49$.

Answer: $6 < \sqrt{42} < 7$.

7. Give consecutive integer bounds for $-\sqrt{17}$. [2 marks]

$4 < \sqrt{17} < 5$; negate and reverse the order.

Answer: $-5 < -\sqrt{17} < -4$.

8. Order $\sqrt{5}$, 2.2 and $\frac{9}{4}$ from least to greatest. [3 marks]

$2.2^2 = 4.84 < 5 < 5.0625 = 2.25^2$ and $\frac{9}{4} = 2.25$.

Answer: $2.2 < \sqrt{5} < \frac{9}{4}$.

9. Show that $\sqrt{26}$ lies between 5.0 and 5.1. [2 marks]

$25 < 26 < 26.01$.

Answer: $5.0 < \sqrt{26} < 5.1$.

10. Find $\sqrt{34}$ to one decimal place. [2 marks]

$\sqrt{34} = 5.830951\ldots$.

Answer: 5.8.

11. A square tile has area $19\ \text{cm}^2$. Give its exact side. [2 marks]

The positive side satisfies $s^2 = 19$.

Answer: $\sqrt{19}\ \text{cm}$.

12. Give the side of a square with area $19\ \text{cm}^2$ to two decimal places. [2 marks]

$\sqrt{19} = 4.358898\ldots$.

Answer: $4.36\ \text{cm}$.

13. A circle has radius $4\ \text{m}$. Give its circumference to one decimal place. [3 marks]

$C = 2\pi(4) = 8\pi = 25.132741\ldots\ \text{m}$.

Answer: $25.1\ \text{m}$.

14. Explain why $\pi = 3.1416$ is an incorrect statement, even though 3.1416 is useful. [3 marks]

3.1416 is a terminating rational number, unlike π.

Write $\pi \approx 3.1416$.

Answer: It requires an approximation sign.

15. A square garden has area $120\ \text{m}^2$. Find its perimeter to one decimal place. [3 marks]

The side is $\sqrt{120}$ metres.

$P = 4\sqrt{120} = 43.817804\ldots\ \text{m}$.

Answer: $43.8\ \text{m}$.

16. A student squares 1.4 and says $\sqrt{2}$ cannot be real because $1.4^2 \neq 2$. Explain the error. [3 marks]

1.4 approximates $\sqrt{2}$ but is not equal to it.

The exact root is real and its square equals 2.

Answer: A rounded approximation need not square to the original exact value.