Real numbers - Practice test 2

16 questions | 38 marks | 50 minutes

Explain classifications and compare exact values with rounded measurements.

Equivalent correct methods earn the corresponding marks.

1. Classify $-\frac{3}{5}$ and state why. [2 marks]

It is an integer fraction with nonzero denominator.

Answer: Rational.

2. Classify each number as rational or irrational. Explain each answer. [4 marks]

(a) $\sqrt{100}$ [2 marks]

$100 = 10^2$, so $\sqrt{100} = 10 = \frac{10}{1}$.

Answer: Rational: 10.

(b) $\sqrt{101}$ [2 marks]

101 is a positive integer that is not a perfect square.

Answer: Irrational.

3. Give a terminating decimal between 0.2 and 0.3 and express it as a fraction. [2 marks]

$0.2 < 0.25 < 0.3$ and $\frac{25}{100} = \frac{1}{4}$.

Answer: For example, $0.25 = \frac{1}{4}$.

4. Write $0.\overline{4}$ as a fraction. [2 marks]

$10x - x = 4$, so $9x = 4$.

Answer: $\frac{4}{9}$.

5. Give consecutive integer bounds for $\sqrt{93}$. [2 marks]

$81 < 93 < 100$.

Answer: $9 < \sqrt{93} < 10$.

6. Which is larger: -2.7 or $-\sqrt{8}$? Explain. [3 marks]

$2.7^2 = 7.29 < 8$, so $2.7 < \sqrt{8}$.

Negating gives $-2.7 > -\sqrt{8}$.

Answer: -2.7.

7. Order $-\sqrt{10}$, -3, $-\frac{13}{4}$ and 0. [3 marks]

$\frac{13}{4} = 3.25$ and $3 < \sqrt{10} < 3.25$ because $3.25^2 = 10.5625$.

Answer: $-\frac{13}{4} < -\sqrt{10} < -3 < 0$.

8. Check whether $6.4 < \sqrt{41} < 6.5$. [2 marks]

$6.4^2 = 40.96 < 41 < 42.25 = 6.5^2$.

Answer: True.

9. Estimate $\sqrt{58}$ to one decimal place. [2 marks]

$\sqrt{58} = 7.615773\ldots$.

Answer: 7.6.

10. A square has side $\sqrt{32}$ cm. Find its exact area. [2 marks]

$A = (\sqrt{32})^2 = 32$.

Answer: $32\ \text{cm}^2$.

11. A circle has diameter $9\ \text{cm}$. Give its exact circumference. [2 marks]

$C = \pi d = 9\pi\ \text{cm}$.

Answer: $9\pi\ \text{cm}$.

12. Round 9π to two decimal places. [2 marks]

$9\pi = 28.274333\ldots$.

Answer: 28.27.

13. Evaluate $25\sqrt{3}$ to two decimal places without rounding the root first. [2 marks]

$25\sqrt{3} = 43.301270\ldots$.

Answer: 43.30.

14. A square play area has area $200\ \text{m}^2$. Find the least whole number of metres of fencing to enclose all four sides. [3 marks]

$P = 4\sqrt{200} = 56.568542\ldots\ \text{m}$.

Round up because fifty-six metres is too short.

Answer: $57\ \text{m}$.

15. Use $r = \frac{C}{2\pi}$ to find the radius for circumference $75\ \text{cm}$. Give two decimal places. [2 marks]

$r = \frac{75}{2\pi} = 11.936620\ldots\ \text{cm}$.

Answer: $11.94\ \text{cm}$.

16. A calculator shows $\sqrt{7} = 2.645751311$. Does this prove the exact root is a terminating decimal? Explain. [3 marks]

7 is not a perfect square, so its root is irrational.

The display rounds the nonterminating decimal.

Answer: No; the display has limited space.