Marking guide | Integers and rational numbers

Integers and rational numbers - topic test

15 questions | 29 marks | 45 minutes

A progressively demanding test of signed calculations, number classification and accuracy.

Equivalent correct methods earn the corresponding marks.

1. Write -3, 2, -7 and 0 in increasing order. [1 mark]

On a number line, smaller values are farther left.

Answer: -7, -3, 0, 2

2. Calculate $-8 + 13$. [1 mark]

$13 - 8 = 5$.

Answer: 5

3. Calculate $7 - (-5)$. [1 mark]

$7 + 5 = 12$.

Answer: 12

4. Calculate $(-6)(-7)$. [1 mark]

Same signs give a positive product.

$6 \times 7 = 42$.

Answer: 42

5. Calculate $-54 \div 6$. [1 mark]

Different signs give a negative quotient.

$54 \div 6 = 9$.

Answer: -9

6. Calculate $-\frac{3}{4}+\frac{1}{6}$. [2 marks]

$-\frac{9}{12}+\frac{2}{12}=-\frac{7}{12}$.

Answer: $-\frac{7}{12}$

7. Calculate $-\frac{5}{8}\div(-\frac{15}{16})$. [2 marks]

$-\frac{5}{8}\times(-\frac{16}{15})=\frac{80}{120}=\frac{2}{3}$.

Answer: $\frac{2}{3}$

8. Calculate $-2.6+0.85$. [2 marks]

$-2.60+0.85=-1.75$.

Answer: -1.75

9. Calculate $20-3(2+4)$. [2 marks]

$2+4=6$, then $20-18=2$.

Answer: 2

10. Work out each expression. [2 marks]

(a) -4^2 [1 mark]

$-4^2=-(4\times4)=-16$.

Answer: -16

(b) $(-4)^2$ [1 mark]

$(-4)(-4)=16$.

Answer: 16

11. Write $\frac{7}{12}$ as a recurring decimal. State whether it terminates. [2 marks]

$\frac{7}{12}=0.58333\ldots$.

The digit 3 repeats.

Answer: $0.58\overline{3}$; it does not terminate.

12. Classify each value as rational or irrational. Give a reason. [3 marks]

(a) $\sqrt{64}$ [1 mark]

$\sqrt{64} = 8 = \frac{8}{1}$.

Answer: Rational.

(b) $\sqrt{10}$ [1 mark]

Ten is not a perfect square.

Answer: Irrational.

(c) $0.\overline{27}$ [1 mark]

It is recurring and equals $\frac{27}{99} = \frac{3}{11}$.

Answer: Rational.

13. Given $6.7^2 = 44.89$ and $6.8^2 = 46.24$, place $\sqrt{45}$ between consecutive tenths. [2 marks]

The number 45 lies between the two supplied squares.

Answer: $6.7 < \sqrt{45} < 6.8$

14. A circular lid has diameter 9 cm. Give its exact circumference. Then estimate it using $\pi = 3.14$. [3 marks]

$C = \pi d = 9\pi$.

With the supplied approximation, $9 \times 3.14 = 28.26$.

Answer: 9π cm; approximately 28.26 cm.

15. Seven students share 9 m of rope equally. Give each share exactly, then rounded to two decimal places. Explain why seven pieces of the rounded length may not total exactly 9 m. [4 marks]

$9 \div 7 = \frac{9}{7} = 1.285714\ldots$.

To two decimal places this is 1.29 m.

Seven rounded pieces total 9.03 m, so exact shares should be used until a practical cutting decision is made.

Answer: $\frac{9}{7}$ m; approximately 1.29 m; rounding changes each piece slightly.