Rational and irrational numbers

6 questions | 13 marks

Equivalent correct methods earn the corresponding marks.

1. Explain why -12 is rational. [2 marks]

Both -12 and 1 are integers and the denominator is not zero.

Answer: $-12 = -\frac{12}{1}$.

2. Classify $\sqrt{81}$ and justify. [2 marks]

$\sqrt{81} = 9 = \frac{9}{1}$.

Answer: Rational.

3. Classify $\sqrt{11}$ and justify. [2 marks]

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

Answer: Irrational.

4. Classify $0.\overline{4}$ and give a fraction. [2 marks]

The repeating decimal 0.444… equals four ninths.

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

5. Is $\frac{22}{7}$ irrational because it approximates π? Explain. [2 marks]

It is a ratio of integers.

Being close to an irrational value does not make a fraction irrational.

Answer: No. It is rational.

6. Leila says every decimal that goes on forever is irrational. Give a counterexample. [3 marks]

This decimal does not end but repeats.

Its fraction form proves it is rational.

Answer: $0.\overline{3} = \frac{1}{3}$.