Absolute, relative and percentage error

6 questions | 15 marks

Equivalent correct methods earn the corresponding marks.

1. A measurement is 78 m and the accepted length is 80 m. Find its absolute, relative and percentage error. [3 marks]

$|78 - 80| = 2$ m; $2/80 = 0.025$; $0.025 \times 100\% = 2.5\%$.

Answer: 2 m; 0.025; 2.5%

2. A 20 g reference is measured as 20.4 g. Find the percentage error. [2 marks]

Error $= 0.4$ g; $0.4/20 \times 100\% = 2\%$.

Answer: 2%

3. A 250 L tank capacity is estimated as 240 L. Find the absolute and percentage errors. [2 marks]

Absolute error $= 10$ L; $10/250 \times 100\% = 4\%$.

Answer: 10 L and 4%

4. A ruler reading is rounded to the nearest 0.1 cm. State the greatest possible rounding error. [2 marks]

Half of a 0.1 cm step is 0.05 cm.

Answer: 0.05 cm

5. A length is recorded as 6.2 m to the nearest 0.1 m. Give the interval of values that round to this reading. [3 marks]

The half-step is 0.05 m. Subtract and add it to 6.2 m. The upper endpoint rounds up to 6.3 m.

Answer: $6.15 \leq L < 6.25$ m.

6. A 100 cm reference is measured as 98 cm. A 50 cm reference is measured as 49 cm. Which has the smaller percentage error? [3 marks]

$2/100 \times 100\% = 2\%$ and $1/50 \times 100\% = 2\%$.

Answer: Neither; both have 2% error.