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; $\frac{2}{80}=0.025$; $0.025\times100\%=2.5\%$.

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; $\frac{0.4}{20}\times100\%=2\%$.

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; $\frac{10}{250}\times100\%=4\%$.

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: $6.15\le L<6.25$ 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]

$\frac{2}{100}\times100\%=2\%$ and $\frac{1}{50}\times100\%=2\%$.

Answer: Neither; both have 2% error.