Solution
Compare the uncertainty when rounding numbers of various magnitudes.

a) Find the percent uncertainty for 1.1

This number implies a measurement falling in the range $1.05 \leq x < 1.15$. The uncertainty is ± 0.05. Comparing this uncertainty with the measured value, we have a percent uncertainty of

$$\% \, Uncertainty = \frac{Uncertainty}{Value} \times 100\%$$

$$\% \, Uncertainty = \frac{\pm 0.05}{1.1} \times 100\% = \pm 4.5\% \approx \pm 5\%$$

b) Find the percent uncertainty for 5.0

This number implies a measurement falling in the range $4.95 \leq x < 5.05$. The uncertainty is ± 0.05. Comparing this uncertainty with the measured value, we have a percent uncertainty of

$$\% \, Uncertainty = \frac{Uncertainty}{Value} \times 100\%$$

$$\% \, Uncertainty = \frac{\pm 0.05}{5.0} \times 100\% = \pm 1.0\%$$

c) Find the percent uncertainty for 9.9

This number implies a measurement falling in the range $9.85 \leq x < 9.95$. The uncertainty is ± 0.05. Comparing this uncertainty with the measured value, we have a percent uncertainty of

$$\% \, Uncertainty = \frac{Uncertainty}{Value} \times 100\%$$

$$\% \, Uncertainty = \frac{\pm 0.05}{9.9} \times 100\% = \pm 0.45\% \approx \pm 0.5\%$$