

1.1.5.2: Comprehension Check

Exercise 1.1.5.2.1

A reported value of 45.35 g implies that the mass is between ____ and ____.

Answer

Mass is between 45.34 g and 45.36 g. It is 45.35 g plus or minus 0.01 g.

Is it possible for a number to have NO uncertainty?

Answer

A defined value or a number of counted items could be exact and therefore have no uncertainty.

Which of the following could be used to measure the precision of a set of numbers?

- a) average (mean)
- b) percent error
- c) standard deviation
- d) median

Answer

c) standard deviation (It tells how close a group of values are to each other. The other choices do not do that.)

Exercise 1.1.5.2.1

You perform an experiment to determine the density of copper, and you obtain a value of 8.62 g/mL. Your reference lists the accepted value as 8.96 g/mL. What is the percent error of your measured value?

Answer

It is 3.8%.

The difference between the values, 0.34 g/mL, is divided by the accepted value of 8.96 g/mL. The result is 0.038. This is multiplied by 100% to give 3.8%.

Exercise 1.1.5.2.1

You are measuring the liquid that is dispensed by a pump that is supposed to dispense 25.00 mL. You measure the following amounts: 24.72 mL, 24.88 mL, 24.85 mL and 24.77 mL. Calculate the average, standard deviation, and percent error.

Answer

Average = 24.81 mL. Standard deviation = 0.07 mL. Percent error = 0.76 %

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