

Percent Error Practice

Directions: *For each of the following situations find the percent error involved. Be careful in determining the true vs. observed value. Make sure to included the correct units and show all work. Answer on a separate sheet of paper.*

1. Samantha measured the volume of her soda before she drank it for her midmorning snack. She measured the volume of the 12 oz. bottle to be 14 oz.
2. Clyde was directed to weigh a 500 g mass on the balance. After diligently goofing off for ten minutes, he quickly weighed the object and reported 458 g.
3. Patty had casually recorded her grades for the nine weeks in her notebook. She concluded she had 250 points out of 300 for the grading period. However, Miraculous (chem teacher) determined she had 225 points out of 300 and awarded her a "C" for the grading period.
4. Drew came to Miraculous with a problem. Drew was told to measure 50 cm of copper wire to use in an experiment. Since his ruler only measured to 45 cm he used this amount of wire and his experiment was a failure.
5. Henry was just arrested for speeding by Officer O'Rourke for traveling 65 mph in a 55 mph zone. Henry claimed his speedometer said 55 mph not 65 mph.
6. Willomina was assigned to determine the density of a sample of nickel metal. When she finished, she reported the density of nickel as 5.59 g/ml. However, Miraculous knew the density of nickel was 6.44 g/ml.
7. An experiment to determine the volume of a "mole" of a gas was assigned to Barry. He didn't read the experiment carefully and concluded the volume was 18.7 liters. Miraculous knew he should have obtained 22.4 liters.

Use the following definitions to help answer questions 8 - 11.

Accurate- how close the experimental value is to the actual.

Precise- how close **repeated** the experimental values are to each other.

8. Fifita uses a thermometer and finds the boiling point of ethyl alcohol to be 75.0 °C on three consecutive experimental measurements. She looks in a reference book and finds the actual boiling point of ethyl alcohol is 78.0 °C.
 - a. What is the percent error?
 - b. Are her measurements accurate? Explain.
 - c. Are her measurements precise? Explain.

9. The density of water at 4 °C is known to be 1.00 g/cm³. Jordan experimentally found the density of water to be 1.085 g/cm³. He took one mass and one volume reading.

- a. What is Jordan's percent error?
- b. Are his measurements accurate? Explain.
- c. Are his measurements precise? Explain.

10. *The Handbook of Chemistry and Physics* lists the density of acetone to be 0.7988 g/mL. Steffan, Andrew and Jasiel each took several mass readings and volume readings (like all good lab groups should!) They then calculated the density to be 0.7914 g/mL, 0.7914 g/mL, 0.7913 g/mL, 0.7915 g/mL and 0.7914 g/mL. Mrs. Joiner allows up to + 0.5 % error to make an "A".

- a. Did Steffan's lab group make an "A"? PROVE YOUR ANSWER.
- b. Was the group accurate? Explain.
- c. Was the group precise? Explain.

11. An object has a mass of 35.00 grams. On Luixandra's balance, it weighs 33.95 grams. What is the percent error of this balance?