SECTION OVERVIEW

2.6: Module 6 Practice

Theory and Law

Exercise 2.6.1

Tell whether each statement is most similar to a hypothesis, observation, theory, or law.

This box of cereal is less expensive than that one.

Answer

observation

The larger the box of cereal, the lower the price per ounce is.

Answer

law

If I buy the largest package of food I can eat before it goes stale, I will save money on groceries.

Answer

hypothesis

The cost associated with packaging plays an important role in setting the price of groceries. For the size of the packaging, the cost does not increase proportionally to the volume. Therefore, the fraction of the price that is going towards packaging is smaller for larger sizes.

Answer

theory

Extensive and Intensive Properties

Exercise 2.6.1

Tell whether each is an extensive or intensive property.

(a) length

(b) mass

(c) temperature

(d) the weight of a piece of clay

(e) the color of the clay

(f) the price of a bunch of apples

(g) the price per pound of the apples

Answer (a)

Extensive

Answer (b)

Extensive

Answer (c)

Intensive

Answer (d)

Extensive

Answer (e)

Intensive

Answer (f)

Extensive

Answer (g)

Intensive

Exact and Measured Numbers

Exercise 2.6.1

Tell whether each number represents an exact number or an uncertain, measured number.

I have 12 coins.

Answer

Exact

The total mass of my coins is 27.420 g.

Answer

Uncertain (measured)

The average mass of each coin is therefore 2.2850 g per coin.

Answer

Uncertain (measured)

One of the metals used to make the coins is nickel, which has a density of 8.908 g/cm^3.

Answer

Uncertain (measured)

The prefix "kilo" means 1000, so there are 1000 g in a kg.

Answer

Exact

That means the total mass of my coins is 0.027420 kg.

Answer

Uncertain (measured)

Precision and Accuracy

Exercise 2.6.1

You used a calibration mass to test three balances. The mass is 25.000 g. Your results are below.

	Balance A	Balance B	Balance C
Trial 1	24.81 g	24.97 g	24.57 g
Trial 2	24.69 g	25.28 g	24.69 g
Trial 3	24.93 g	24.93 g	24.63 g
Trial 4	25.09 g	25.06 g	24.66 g
Trial 5	25.33 g	25.11 g	24.55 g
Average	24.97 g	25.07 g	24.62 g
Standard Deviation	0.25 g	0.14 g	0.06 g

Which balance is the most precise?

Answer

Balance C. (It has the lowest standard deviation. The trials are closest together.)

Which balance is the least precise?

Answer

Balance A.

Which balance is the most accurate?

Answer

Balance A. (The average value is closest to 25.000 g)

Which balance is the least accurate?

Answer

Balance C.

What is the percent error of balance B? (Use the average measurement to calculate.)

Answer

0.3 %.