

## 2.1: Module 1 Practice

### Exact and Measured Numbers

#### Exercise 2.1.1

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  $8.908 \text{ g/cm}^3$ .

**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.

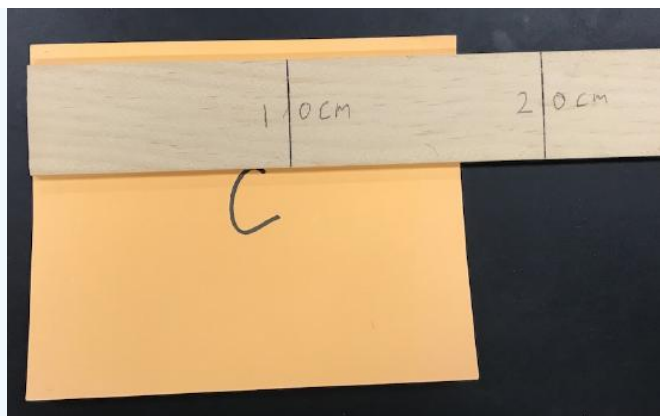
**Answer**

Uncertain (measured)

### Measurement

#### Exercise 2.1.1

What measurement should you record for the paper below using the ruler shown?



### Hint

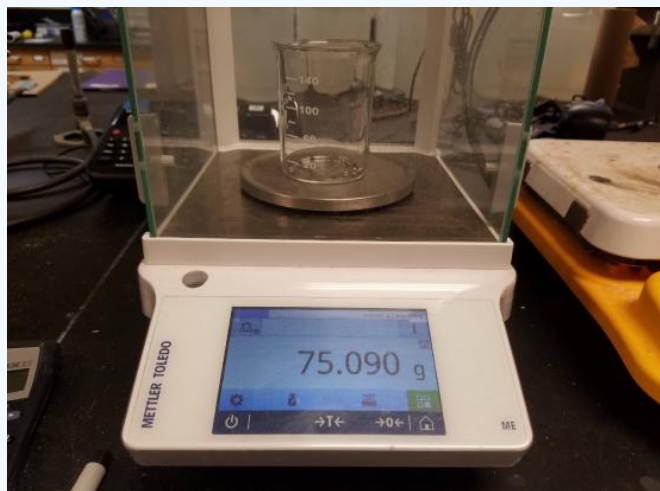
The lines are every ten cm. You should record to the one cm.

### Answer

17 cm. (If you put 16 cm or 18 cm, that is also acceptable.)

### Exercise 2.1.1

What mass should you record for the beaker using the balance below?



### Answer

75.090 g. Use all digits given by a digital instrument. Do not round off or add more.

### Exercise 2.1.1

What measurement should you put for the liquid level below:

- if you believe the liquid level is just below the line?
- if you believe the liquid level is right on the line?

Remember to read the bottom of the meniscus (curve). The units are mL.

**Hint**

The lines are every 0.1 mL (even though numbers are every mL). You should record to the 0.01 mL.

**Answer a**

19.41 mL or 19.42 mL.

**Answer b**

19.40 mL (two past the decimal, just like answer a)

## Significant Digits

### Exercise 2.1.1

Tell the number of significant digits in each measurement.

- (a) 0.00760 kg
- (b) 470.80 mL
- (c) 80500 cm

**Answer (a)**

3 SD

**Answer (b)**

5 SD

**Answer (c)**

3 SD

### Exercise 2.1.1

Round each measurement to 4 significant digits.

- (d) 78043.7 m
- (e) 0.042268 km
- (f) 5.07038 g
- (g) 120.677 g

**Answer (d)**

78040 m

**Answer (e)**

0.04227 km

**Answer (f)**

5.070 g

**Answer (g)**

120.7 g

## Dimensional Analysis (conversions)

**Exercise 2.1.1**

Convert  $\frac{26.82 ft}{s}$  to  $\frac{mi}{h}$ . There are 5280 feet in a mile (defined, exact relationship).

**Answer**

$$\frac{18.29 mi}{h}$$

**Exercise 2.1.1**

Given the relationships provided below, how many tablespoons (tbsp) are in 3.46 quarts (qt)?

1 tbsp = 14.787 mL

1 qt = 946.35 mL

**Answer**

221 tbsp

## Metric Conversions

**Exercise 2.1.1**

How many  $\mu\text{g}$  are in 78.4 fg?

**Answer**

$$7.84 \times 10^{-8} \mu\text{g}$$

**Exercise 2.1.1**

How many mg are in 0.00567 Gg?

**Answer**

$5.67 \times 10^9 \text{ mg}$  or 5,670,000,000 mg

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