Name: _____ Date: _____

Skill and Practice

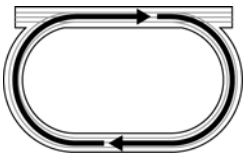
1I SI-English Conversions

Read:

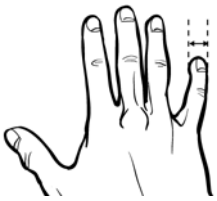
Even though the United States adopted the SI system in the 1800's, most Americans still use the English system (feet, pounds, gallons, etc.) in their daily lives. Because almost all other countries in the world, and many professions (medicine, science, photography, and auto mechanics among them) use the SI system, it is often necessary to convert between the two systems.

It is useful to be familiar with examples of measurements in both systems. Most people in the United States are very familiar with English system units because they are used in everyday tasks. Some examples of SI system measurements are:

One kilometer (1 km) is about two and a half times around a standard running track.



One centimeter (1 cm) is about the width of your little finger.



One kilogram (1 kg) is about the mass of a full one-liter bottle of drinking water.

One gram (1 g) is about the mass of a paper clip.

One liter (1 l) is a common size of a bottle of drinking water.

One milliliter (1 mL) is about one droplet of liquid.

Skill and Practice

When precise conversions between SI and English systems are necessary, you will need to know the conversion factors given in the table below.

Measurement	Equivalents
Length:	1 inch = 2.54 centimeters 1kilometer ≈ 0.62 mile
Volume:	1 liter ≈ 1.06 quart
Mass: Weight (on Earth)	1 kilogram ≈ 2.2 pounds 1 ounce ≈ 28 grams

Examples:

1. If we need to know the mass of a 50-pound bag of dog food in kilograms, we take the following steps:

   (1) Restate the question: 50 lb ≈ _____ kg

   (2) Find the conversion factor from the table: 1 kg ≈ 2.2 lb

   (3) Multiply the ratios making sure that the unwanted units cancel, leaving only the desired units (kilograms) in the answer:

$$\frac{50 \cancel{\text{ lb}}}{1} \bullet \frac{1 \text{ kg}}{2.2 \cancel{\text{ lb}}} \approx \frac{50 \text{ kg}}{2.2} \approx 22.7272 \text{ kg} \approx 23 \text{ kg}$$

2. How many inches are equivalent to 99 centimeters?

   (1) Restate the question: 99 centimeters = _____ inches

   (2) Find the conversion factor from the table: 1 inch = 2.54 centimeters.

   (3) Multiply the ratios. Make sure the units cancel correctly to produce the desired unit in the answer.

$$\frac{99 \cancel{\text{ cm}}}{1} \bullet \frac{1 \text{ in}}{2.54 \cancel{\text{ cm}}} = \frac{99 \text{ in}}{2.54} = 38.97638 \text{ in} \approx 39 \text{ inches}$$

3. An eighth grader is 5 feet 10 inches tall. We want to know how many centimeters that is without measuring.

   (1) Restate the question: 5 feet 10 inches = _____ centimeters

   (2) Convert units within one system if necessary: 5 feet 10 inches needs to be rewritten as either feet or inches. Since our conversion factor (from the table) is given as 1 inch = 2.54 centimeters, it makes sense to rewrite the quantity 5 feet 10 inches as some number of inches. First convert the number of feet (5) to inches, then add 10 inches. Since there are 12 inches in 1 foot, use that as your conversion factor to calculate:

$$\frac{5 \cancel{\text{ ft}}}{1} \bullet \frac{12 \text{ in}}{1 \cancel{\text{ ft}}} = \frac{60 \text{ in}}{1} = 60 \text{ inches}$$

Now add: 60 inches + 10 inches = 70 inches. 5 feet 10 inches = 70 inches. We now need to convert 70 inches to centimeters.

(3) Restate the question: 70 inches = _____ centimeters.

(4) Choose the correct conversion factor from the table. Here, we want to convert inches to centimeters, so use 1 inch = 2.54 centimeters.

(5) Multiply the ratios. Make sure the units cancel correctly to produce the desired type of unit in the answer.

$$\frac{70 \cancel{\text{in}}}{1} \bullet \frac{2.54 \text{ cm}}{1 \cancel{\text{in}}} = \frac{177.8 \text{ cm}}{1} = 180 \text{ cm}$$

Practice:

1. 7.0 km ≈ _____ mi
2. 115 g ≈ _____oz
3. 2,000 lb. ≈ _____kg
4. A 2.0-liter bottle of soda is about how many quarts?

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5. A pumpkin weighs 5.4 pounds. What is its mass in grams? (Hint: There are 16 ounces in one pound).

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6. Felipe biked 54 kilometers on Sunday. How many miles is this?

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7. How many inches are in 72.0 meters? How many yards is this?

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8. In a track meet, Julian runs the 800 meter dash, the 1600 meter run, and the opening leg of the 4 × 400 meter relay. How many miles is this altogether?

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9. How many liters are equivalent to 1.0 gallon? (There are exactly four quarts in a gallon.)

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10. The mass of a large order of french fries is about 170 grams. What is its approximate weight in pounds?
