

## Using Rates for Unit Conversions

## Warmup

1. 1 cm = \_\_\_\_\_ mm

1 km = \_\_\_\_\_ m

1 yard = \_\_\_\_\_ feet

1 meter = \_\_\_\_\_ cm

1 mile = \_\_\_\_\_ feet

1 foot = \_\_\_\_\_ inches

2. A fraction equals 1 when the numerator \_\_\_\_\_ the denominator.

An example of a fraction that equals 1 is: —

3.  $\frac{(2)(3)(5)}{(7)(5)(3)}$

4.  $\frac{(2)(6)(9)}{(9)(11)(2)}$

## Using Rates for Unit Conversions

- I. Understanding Conversions
- II. Multiplying by Unit Rates
- III. Calculating the Unit Conversions

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Pre-Algebra and Geometry I

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## I. Understanding Conversions

## Us Customary Volume and Capacity Equivalent Measures



## Us Customary Time Equivalent Measures



## Us Customary Length Equivalent Measures



## Us Customary to metric conversion



## Unit Conversions

## Metric Equivalent Measures

10 mm = 1 cm

100 cm = 1 m

1000 m = 1 km

### Us Customary Volume and Capacity Equivalent Measures

8 ounces = 1 cup

2 cups = 1 pint

2 pints = 1 quart

4 quarts = 1 gallon

## Us Customary Time Equivalent Measures

60 seconds = 1 minute

60 minutes = 1 hour

24 hours = 1 day

7 days = 1 week

52 weeks = 1 year

365 days = 1 year

366 days = 1 leap year

12 months = 1 year

## Us Customary Length Equivalent Measures

12 inches = 1 foot

3 feet = 1 yard

5280 feet = 1 mile

1760 yards = 1 mile

## Us Customary to metric conversion

2.54 cm = 1 inch

2 pints = \_\_\_\_\_ quarts

Therefore

$$\frac{2 \text{ pints}}{\text{_____ quarts}} = \frac{\text{_____ quarts}}{2 \text{ pints}} = 1$$

1 yard = \_\_\_\_\_ feet

Therefore

$$\frac{1 \text{ yard}}{\text{_____ feet}} = \frac{\text{_____ feet}}{1 \text{ yard}} = 1$$

Write two rates regarding  
minutes to hours.

5. Write two rates involving days and years.

6. Write two rates involving yards and miles.

## II. Multiplying by Unit Rates

How many days are in 4 weeks?

4 weeks = \_\_\_\_\_ days

7 days = 1 week

4 weeks  $\left( \frac{7 \text{ days}}{1 \text{ week}} \right) = \text{_____} = \text{_____ days}$

Cross Cancel

$$\frac{2 \text{ hours}}{1} \cdot \frac{60 \text{ minutes}}{1 \text{ hour}}$$

Cross Cancel

$$\frac{6 \text{ quarts}}{1} \cdot \frac{1 \text{ gallon}}{4 \text{ quarts}}$$

8. Cross cancel the like-factors.

$$\frac{3 \text{ meters}}{1} \cdot \frac{1 \text{ km}}{1000 \text{ meters}} = \frac{3}{1000} \text{ km}$$

9. Cross cancel the like-factors.

$$\frac{5 \text{ miles}}{1} \cdot \frac{1760 \text{ yards}}{1 \text{ mile}} = \frac{(5)(1760)}{1} \text{ yards}$$

**10.** Determine the unit rate used to convert 4 inches to feet.

$$4 \text{ inches} \cdot \text{—————} = \text{—————} \text{ feet}$$

**11.** Determine the unit rate used to convert 8 cups to ounces.

$$8 \text{ cups} \cdot \text{————} = \text{————} \text{ ounces}$$

### III. Calculating the Unit Conversions

How many minutes are in 45 seconds?

45 seconds = \_\_\_\_ minutes

60 seconds = 1 minute

45 seconds () = \_\_\_\_ = \_\_\_\_ minutes

Convert 12 ounces to cups.

(Round to 4 decimal places)

Convert 2 cm to mm.

(Round to 4 decimal places)

**13.** Convert 9 years to weeks.

(Round to 4 decimal places)

**14.** Convert: 25 cm = \_\_\_\_\_ inches

(Round to 4 decimal places)



[illegible]