

Conversions with Two Unit Rates

Warmup:

1. Write two rates involving days and years

$\frac{\text{days}}{\text{years}}$ and $\frac{\text{years}}{\text{days}}$

2. Multiply $(\frac{10}{12})(\frac{60}{100})(\frac{5}{25})$

3. Convert: 13 mile = _____ yards

4. Convert: 7 feet = _____ yards

- I. Cross Cancel Units
- II. Determine Which Unit Rates To Use
- III. Convert Units Using Two Unit Rates

Homeschool



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Pre-Algebra and Geometry I

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I. Cancel Unit Rates in Unit Conversions

Unit Conversions: Multiply by unit rates to cancel the units.

Each unit rate equals 1

$$\text{Since } 8 \text{ ounces} = 1 \text{ cup} \quad \frac{8 \text{ ounces}}{1 \text{ cup}} = 1$$

To convert 30 ounces to pints, use Unit Rates to cancel the pints. Two unit rates will be needed.

$$30 \text{ ounces} \cdot \frac{1 \text{ cup}}{8 \text{ ounces}} \cdot \frac{1 \text{ pint}}{2 \text{ cups}} = \underline{\hspace{2cm}} \text{ pints}$$

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

Cross out the units

$$10560 \text{ inches} \cdot \frac{1 \text{ foot}}{12 \text{ inches}} \cdot \frac{1 \text{ mile}}{5280 \text{ feet}} = \underline{\hspace{2cm}} \text{ miles}$$

Cross out the units

$$2 \text{ km} \cdot \frac{1000 \text{ m}}{1 \text{ km}} \cdot \frac{10 \text{ cm}}{1 \text{ m}} = \underline{\hspace{2cm}} \text{ cm}$$

5. Cross out the units

$$3 \text{ hours} \cdot \frac{60 \text{ minutes}}{1 \text{ hour}} \cdot \frac{60 \text{ seconds}}{1 \text{ minute}} = \underline{\hspace{2cm}} \text{ seconds}$$

6. Cross out the units

$$14 \text{ years} \cdot \frac{365 \text{ days}}{1 \text{ year}} \cdot \frac{24 \text{ hours}}{1 \text{ day}} = \underline{\hspace{2cm}} \text{ hours}$$

II. Determine Which Unit Rates To Use

To determine which unit rates to use

1. Determine the unit rates to cancel the original units.
2. Determine the unit rates that use the ending units.
3. The unit rates to use will have the same 'third' units.

Convert 100 cm to feet

The unit rates
with cm:

$$2.54 \text{ cm} = 1 \text{ inch}$$

$$10 \text{ mm} = 1 \text{ cm}$$

$$100 \text{ cm} = 1 \text{ m}$$

The unit rates
with feet:

$$12 \text{ inches} = 1 \text{ foot}$$

$$3 \text{ feet} = 1 \text{ yard}$$

$$5280 \text{ feet} = 1 \text{ mile}$$

$$2.54 \text{ cm} = 1 \text{ inch}$$

$$12 \text{ inches} = 1 \text{ foot}$$

_____ · _____ · _____ = _____

Determine the unit rates used to convert 10 gallons to pints.

$$\underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Determine the unit rate used to convert 4 inches to yards.

$$\underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

7. Determine the unit rate used to convert 4 inches to yard

8. Determine the unit rate used to convert 12 quarts to cups

III. Convert Units Using Two Unit Rates

To convert 5 pints to ounces, use Unit Rates to cancel the pints. Two unit rates will be needed.

$$5 \text{ pints} \cdot \frac{2 \text{ cups}}{1 \text{ pint}} \cdot \frac{8 \text{ ounces}}{1 \text{ cup}} = \underline{\hspace{2cm}} \text{ ounces}$$

To convert 10 pints to gallons, use Unit Rates to cancel the cups. Two unit rates will be needed.

$$20 \text{ pints} \cdot \frac{1 \text{ quart}}{2 \text{ pints}} \cdot \frac{1 \text{ gallon}}{4 \text{ quarts}} = \underline{\hspace{2cm}} \text{ gallons}$$

Determine the unit rate used to convert 2 weeks to hours

9. Determine the unit rate used to convert 13 weeks to hours

10. Determine the unit rates used in the calculation, then convert 7 mm to m.





