

# Warm-up

1) Multiply

$$(4x - 3)(6x + 1)$$

|      |         |        |
|------|---------|--------|
|      | $4x$    | $-3$   |
| $6x$ | $24x^2$ | $-18x$ |
| $1$  | $4x$    | $-3$   |

$24x^2 - 14x - 3$

2) Simplify

$$(7x^2 - 3x + 10) - (-6x^2 - 4x + 6)$$

$$7x^2 - 3x + 10 + 6x^2 + 4x - 6$$

$$13x^2 + x + 4$$

3) Simplify ↑ show work

$$3\sqrt{2} - 2\sqrt{2} + 7\sqrt{6}$$

$2\sqrt{2} \quad 23$

$2\sqrt{2}$

$$3\sqrt{2} - 2 \cdot 2\sqrt{2} + 7\sqrt{6}$$

$$3\sqrt{2} - 4\sqrt{2} + 7\sqrt{6}$$

$$-1\sqrt{2} + 7\sqrt{6}$$

OR

$$7\sqrt{6} - \sqrt{2}$$

Module 0.9

Name: \_\_\_\_\_

**Dimensional Analysis** is the process of converting units. Use either the conversion factors that are given and/or some common conversion factors you may know to complete the problems below.

1.) A family pool holds 10,000 gallons of water. How many cubic meters is this? (264.2 gal = 1 cubic m)

$$\frac{10000 \cancel{\text{gal}}}{1} \cdot \frac{1 \text{ cubic meters (m}^3\text{)}}{264.2 \cancel{\text{gal}}} = 37.85 \text{ m}^3$$

2.) The average American student is in class 330 minutes/day. How many hours/day is this?

$$\frac{330 \cancel{\text{mins}}}{1 \text{ day}} \cdot \frac{1 \text{ hr}}{60 \cancel{\text{mins}}} = 5.5 \text{ hr/day}$$

3.) How many seconds are there in 1 year?

$$\frac{1 \cancel{\text{yr}}}{1} \cdot \frac{365 \cancel{\text{days}}}{1 \text{ yr}} \cdot \frac{24 \cancel{\text{hr}}}{1 \cancel{\text{days}}} \cdot \frac{60 \cancel{\text{min}}}{1 \cancel{\text{hr}}} \cdot \frac{60 \cancel{\text{sec}}}{1 \cancel{\text{min}}} = 31,536,000 \text{ secs}$$

4.) Pepsi puts 355 ml of pop in a can. How many drops is this? (20 drops = 1 ml)

$$\frac{355 \cancel{\text{ml}}}{1} \cdot \frac{20 \text{ Drops}}{1 \cancel{\text{ml}}} = 7,100 \text{ drops}$$

5.) Sixty miles/ hour is how many ft/sec? (5,280 ft = 1 mi)

$$\frac{60 \cancel{\text{miles}}}{1 \cancel{\text{hr}}} \cdot \frac{5280 \text{ ft}}{1 \cancel{\text{miles}}} \cdot \frac{1 \cancel{\text{hr}}}{60 \cancel{\text{min}}} \cdot \frac{1 \cancel{\text{min}}}{60 \text{ SECS}} = 88 \text{ ft/sec}$$

6.) The distance from Santa Maria to Los Alamos is 16.25 mi. What is the distance in km? (0.621 mi = 1 km)

$$\frac{16.25 \cancel{\text{miles}}}{1} \cdot \frac{1 \text{ km}}{0.621 \cancel{\text{miles}}} = 26.17 \text{ km}$$

7.) In the US a common speed limit is 55 miles per hour. Does this correspond to a European speed limit of

- a) 40 km/h
- b) 60 km/h
- c) 80 km/h

$$\frac{55 \cancel{\text{miles}}}{1 \cancel{\text{hr}}} \cdot \frac{1 \text{ km}}{0.621 \cancel{\text{miles}}} = 88 \text{ km/hr}$$

