

## 4.4

Saturday, September 15, 2012  
10:53 AM

### Problem-Solving Using Systems of Equations

1. Read the problem.
2. Write two equations using 2 variables for the unknowns
3. Solve one equation for one variable and substitute it into the other equation. Solve.
4. State your answer.
5. Check your answer.

Ex. A restaurant purchased 8 tablecloths and 5 napkins for \$106. A week later, they bought 1 tablecloth and 6 napkins for \$24. Find the cost of one tablecloth and the cost of one napkin?  
(Assume the prices didn't change during that week).

1.  $t = \text{\$tablecloth}$      $n = \text{\$napkin}$

2.  $8t + 5n = 106$      $1t + 6n = 24$

3.  $t + 6n = 24$   
     $\quad -6n \quad -6n$      $t = 24 - 6n$

$8t + 5n = 106$   
 $8(24 - 6n) + 5n = 106$   
 $192 - 48n + 5n = 106$   
 $192 - 43n = 106$   
     $-192 \quad -192$   
     $\frac{-43n = -86}{-43 \quad -43}$

$n = 2$     napkins \$2

4.  $t = 24 - 6(2)$   
     $= 24 - 12 = 12$     tablecloth

Simple Interest for one year

Interest = Principal \* rate

$I = Pr$

Ex. You have \$1000 in an account earning 7.5%. How much interest do you earn in one year?

$$I = P \cdot r$$
$$I = 1000 * .075 = 75$$

Ex. You have \$10,000 total to invest in two accounts; one earning 7% and the other 9%. You earn \$860 in interest the first year. How much was in each account?

	$I = P \cdot r$		
Act #1	$.07x$	$x$	$.07$
Act #2	$.09(10000-x)$	$10,000-x$	$.09$
total	860	10,000	

total  $\rightarrow$  10,000 - X  
how much you already spent  $\rightarrow$

Interest 1<sup>st</sup> Act + Interest 2<sup>nd</sup> Act = total Interest

$$.07x + .09(10000-x) = 860$$

$$.07x + 900 - .09x = 860$$

$$-.02x + 900 = 860$$
$$-900 \quad -900$$

$$-.02x = -40$$
$$\frac{-.02x}{-.02} = \frac{-40}{-.02}$$

$$x = \$2000, \$8000$$

$$x = 2000, \$8000$$

Mixture Problems

Amount of Solution \* concentration = amount of ingredient

Ex. You have 2 glasses of a mixed drink; Glass A is 30% pop, Glass B is 10% pop. How much of each do you need to mix to get 16 ounces of a mixed drink that is 25% pop?

	Amt Soln drink	* concentration % pop	= amt ingr. pop
glass A	X	.30	.30X
glass B	16 - X	.10	.10(16 - X)
total	16	.25	4 oz

$$.30X + .10(16 - X) = 4$$

$$.3X + 1.6 - .1X = 4$$

$$.2X + 1.6 = 4$$

$$\quad -1.6 \quad -1.6$$

$$\frac{.2X}{.2} = \frac{2.4}{.2}$$

$$x = 12 \text{ oz from glass A}$$

$$2 \text{ oz from glass B}$$

Ex. I have 5 lbs of almonds costing \$2 per lb and some cashews costing \$7 per lb. I mix the two together to get a mixture worth \$6 per lb. How many lbs of mixed nuts do I have?