I can: Solve Systems of Two Equations by Application of Word Problems (total value and mixture problems and motion problems)
          Solve Systems of Equations using THREE variables

3.3 and 3.4

Mixture Problems

In order to make a necklace a jewelry designer purchased 80 beads for a total of $39. Some of the beads were sterling silver beads that cost 40 cents each and the rest were gemstone beads that cost 65 cents each. How many of each type did the designer buy?

$$x + y = 80$$
$$.40x + .65y = 39$$

① $x = 80 - y$

$$.40(80 - y) + .65y = 39$$
$$32 - .40y + .65y = 39$$

$$32 + .25y = 39$$
$$-32 \qquad -32$$
$$\frac{.25y}{.25} = \frac{7}{.25}$$

$y = 28$ gemstones

$x = 52$ silver

In a certain year, brand A of heart-rate watch cost

$36.23 and brand B cost

$55.23. A nonprofit community health organization purchased

36 heart-rate watches for use at a wellness center. If the organization spent

$1589.28 for the watches, how many of each type did they purchase?

$$X + y = 36$$
$$36.23X + 55.23y = 1589.28$$
$$X = \boxed{36 - y}$$

$$36.23(36 - y) + 55.23y = 1589.28$$
$$1304.28 - 36.23y + 55.23y = 1589.28$$

$$1304.28 + 19y = 1589.28$$
$$-1304.28 \qquad\qquad -1304.28$$
$$\frac{19y}{19} = \frac{285}{19}$$
$$\boxed{y = 15}$$

$$X = 36 - 15$$
$$\boxed{X = 21}$$

Teapots n Treasures sells loose Oolong tea for $2.15 an ounce. Donna mixed Oolong tea with shaved almonds that sell for $0.95 an ounce to create the Market Street Oolong blend that sells for $1.85 an ounce. One week she made 300 ounces of Market Street Oolong. How much tea and how much shaved almonds did she use?

$$t + a = 300$$

$$2.15t + .95a = (300)1.85)$$

Each course at college X is worth either 22 or 33 credits. The members of the men's swim team are taking a total of 50 courses that are worth a total of 115 credits. How many 22-credit courses and how many 33-credit courses are being taken?

$$x + y = 50$$
$$ -y \qquad -y$$
$$2x + 3y = 115$$

$$x = 50 - y$$

$$2(50 - y) + 3y = 115$$

$$100 - 2y + 3y = 115$$

$$100 + y = 115$$
$$-100 \qquad -100$$
$$\boxed{y = 15}$$

$$x = 50 - 15$$
$$\boxed{x = 35}$$

Motion Problems

d = r t (distance equals rate times time)

A Vermont Railways freight train loaded with logs leaves Boston heading to Washington DC at a speed of 60 km/h. Two hours later an Amtrak Metroliner leaves Boston bound for Washington DC on a parallel track at 90 km/h. At what point will the Metroliner catch up to the freight train?

the time for the second train is going to be t -2

freight train   d = 60t
metroliner   d = 90(t-2)

don't forget to plug the answer back into the equation to find the DISTANCE at which they will catch up

	Distance	Rate	Time
Freight Train			
Metroliner			

Mixing Fertilizer

Nature's Green Gardening, Inc. carries two brands of fertilizer containing nitrogen and water. "Gentle Grow" is 3% nitrogen and "Sun Saver" is 8% nitrogen. Nature's Green needs to combine the two types of solution into a 90-L mixture that is 6% nitrogen. How much of each brand should be used?

A boeing 747 jet flies 4 hr west with a 60 mph tailwind. Returning against the wind takes 5 hr. Find the speed of the jet with no wind.

with wind r + 60   d = (r +60) x 4
against the wind r -60   d = (r-60) x 5

	Distance	Rate	Time
With wind			
Against wind			

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Solving Systems with 3 variables

x + y + z = 4

x - 2y - z = 1

2x - y - 2z = -1

$$4x - 2y - 3z = 5$$

$$-8x - y + z = -5$$

$$2x + y + 2z = 5$$

$$x - y - z = 0$$

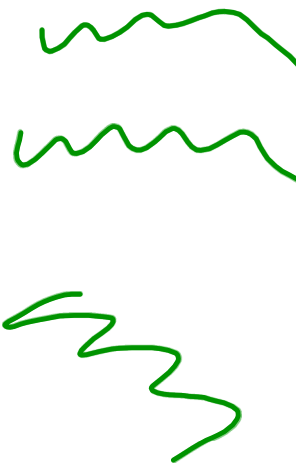$$2x - 3y + 2z = 7$$

$$-x + 2y + z = 1$$

$$x + y + z = 105$$

$$10y - z = 11$$

$$2x - 3y = 7$$

Jan 28-12:00 PM

a system of equations that has at least one solution is said to be CONSISTENT
a system of equations that has no solution is said to be INCONSISTENT

$$y + 3z = 4$$

$$-x + y + 2z = 0$$

$$x + 2y + z = 1$$