Math-I 110 3.3 Notes

Solve general applications of systems of two equations

1. The sum of two numbers is 14. The first number is $\frac{2}{5}$ of the second number. What are the numbers?

$$\chi + y = 14$$

$$\chi = \frac{2}{5}y$$

HW.

2. A nontoxic wood furniture polish can be made by mixing mineral (or olive) oil with vinegar. To make a 19-oz batch for a squirt bottle, Jazmyn uses an amount of mineral oil that is 4 oz more than twice the amount of vinegar. How much of each ingredient is required?

$$x = 2x + 4$$

3. Two angles are supplementary one angle is 4° less than three times the other. Find the measures of the angles.

$$2+9=180$$

 $5=32-4$

Supplementary => angles add

to 180°

Complementary => angles add

4. Two angles are complementary. Their difference is 22 °. Find the two angles.

$$2+9=90$$

 $2-9=22$
 $32=112 \Rightarrow x=56$
 $y=34$

77

7

5. Anna purchased 33 strings for her autoharp. Wrapped strings cost \$3.99 each and unwrapped strings cost \$ 2.99 each. If she paid a total of \$116.67 for the strings, how many of each type did she buy?

x+y=33 => y=33-x

$$3.99x + 2.99y = 116.67 \Rightarrow 3.99x + 2.99(33-x) = 116.67$$

 $3.99x + 98.67 - 2.99x = 116.67 \Rightarrow x = 116.67 - 98.67 = 18$
 $\Rightarrow x = 18 \Rightarrow y = 33-18 = 16$

18 wrapped and 15 unwrapped Strings.

6. There is an online group that knits items for nursing homes and shelters. For a recent campaign, they spent a total of 982 hr. knitting hats and scarves. Each hat takes 9 hr. to knit and each scarf takes 11 hr. to knit. If they donated 100 items, how many of each did they knit?

hats
$$\Rightarrow x_9$$
 Scarves $\Rightarrow y$
 $x+y=100$ $\Rightarrow y=100-x$
 $9x+11y=982$ (Substitute)
 $x=59$ $y=41$

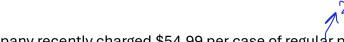
Solve total-value and mixture applications using systems of two equations

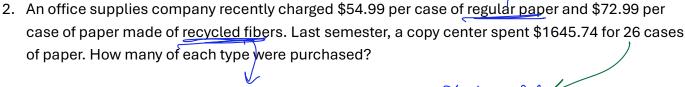
38 2-Credit course and

1. Each course at college X is worth either 2 or 3 credits. The members of the swim team are taking a total of 49 courses that are worth a total of 109 credits. How many 2-credit courses and how many 3-credit courses are being taken?

3x + 3y = 109 3x + 3y = 98 3x + 3y = 98 y = 11 y = 11 y = 11 y = 11 y = 49 x = 38

11 3- Credit Courses,





$$x_{t}y = 36$$

$$54.99x + 72.99y = 1646.74$$

$$54.99x + 54.99y = 1429.74$$

$$18y = 216$$

$$2 + 12 = 26 \Rightarrow x = 14$$

$$y = 12$$

$$14 \text{ regular and } 12 \text{ recycled fiber Gages.}$$

3. A home improvement retailer recently sold 8.5-watt LED bulbs for \$3.99 each and 18-watt LED bulbs for \$8.97 each. If a hospital purchased 200 such bulbs for a total of \$1445.40, how many of each type did they purchase?

4. An amusement park charges \$78.95 for an adult admission and \$56.95 for a junior admission. One Thursday, the park collected \$23,208.00 from a total of 360 adults and juniors. How many admissions of each type were sold?

$$78.95 \times + 78.95 \times = 360$$

$$78.95 \times + 56.95 \times = 232.08$$

$$78.95 \times + 78.95 \times = 360 \times 78.95$$

5. The Coffee Counter charges \$7.00 per pound for Kenyan French Roast coffee and \$11.00 per pound for Sumatran coffee. How much of each type should be used to make a 26-pound blend that sells for \$9.00 per pound?

Mixture

that sells for \$9.00 per pound? for mixture
$$\Rightarrow$$
 Total Cost of 26-Pound Let kengar French rogst be x pounds \Rightarrow Sumatran be y Pounds \Rightarrow 134

$$(x+y=26) x-7 \Rightarrow -7x-7y=-182$$

$$7x+11y=234$$

$$4y=52 \Rightarrow y=13 \Rightarrow x=13$$

6. A local culinary market sells ground sumac for \$1.25 per ounce and ground thyme for \$1.50 per ounce. You want to make a 20-oz seasoning blend using the two spices that sells for \$1.30 per ounce. How much of each spice should you use?

Let
$$x \circ z \circ f \quad 8umac \circ y \circ z \circ f \quad thyme$$

$$(x+y=20) \times 1.25$$

$$1.25x+1.50y=1.30x20=26$$

$$1.25x+1.50y=1.30x20=26$$

7. An experiment requires mixing a 50%-acid solution with a 20%-acid solution to create 200 mL of a 26%-acid solution. How much 50%-acid solution and how much 20%-acid solution should be used? Complete the table shown to the right.

30x = 1200 => x = 40mL => y=160 mL