

**Do Not Solve yet! Define 2 variables and write a system of equations for each problem.**

If you have time, go back and solve the systems and write a complete sentence answer for each problem.

1. The difference between two numbers is 14. When twice the first number is added to the second number, the result is 10. What are the two numbers?

Let  $x =$  1<sup>st</sup> number

Let  $y =$  2<sup>nd</sup> number

System: 
$$\begin{cases} x - y = 14 \\ 2x + y = 10 \end{cases}$$

start here  
to define  
variables

2. Three hundred tickets were sold for the annual pancake breakfast. Adult tickets cost \$5 and children's tickets cost \$2.50. Total receipts for the breakfast were \$1187.50. Find the number of each type of ticket sold.

Let  $x =$  # of Adult tickets

Let  $y =$  # of Children's tickets

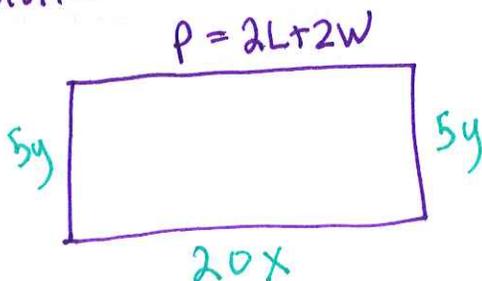
System: 
$$\begin{cases} x + y = 300 \\ 5x + 2.50y = 1187.50 \end{cases}$$

3. A rectangular lot whose perimeter is 1600 feet is fenced along three sides. An expensive fencing along the lot's length costs \$20 per foot. An inexpensive fencing along the two side widths costs only \$5 per foot. The total cost of the fencing along the three sides comes to \$13,000. What are the lot's dimensions? (Hint: Draw a picture!)

Let  $x =$  length

Let  $y =$  width

System: 
$$\begin{cases} 2x + 2y = 1600 \\ \$20x + 2(\$5y) = \$13,000 \end{cases}$$



4. [A bank loaned out \$250,000] part of it at the rate of 8% annual mortgage interest and the rest at a rate of 18% annual credit card interest. The interest received on both loans totaled \$23,000. [How much] was loaned at each rate?

Let  $x =$  \$ amount of loans at 8% (mortgage)  
 Let  $y =$  \$ amount of loans at 18% (credit cards)

System: 
$$\begin{cases} x + y = 250,000 \\ .08x + .18y = 23,000 \end{cases}$$

1.08  
1.18

5. A candy company needs to mix a 20% fat-content chocolate with a 15% fat-content chocolate to obtain 50 kilograms of a 16% fat-content chocolate. How many kilograms of each type should they use?

Let  $x =$  kg of 20% fat choc  
 Let  $y =$  kg of 15% fat choc

System: 
$$\begin{cases} .20x + .15y = .16(50) \\ x + y = 50 \end{cases}$$

Mixture

write out a complete sentence for word problems

If you have time, start solving the systems and write your answers in a complete sentence. You may solve on another sheet of paper if necessary.

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# Mth 65 Required Course Supplement

## Supplement to §4.4

*Mixture Problems*

1.) Hugo Reyes was mixing dried mango slices with dried pineapple to create a delightful island mix. The mango costs \$5.99 per pound and the pineapple costs \$3.99 per pound.

a.) Is it possible for Hugo to mix the fruit in such a way to create a mix that costs a total of \$1.99 per pound? *6* *4*  
*NO*

b.) If Hugo mixed the fruit and calculated that his mix would cost \$4.80 per pound, which ingredient did he add more of?

c.) If Hugo had a 5 pound bag of fruit that he said was worth \$5.99 per pound, how much of each fruit did he add to make it?

d.) If Hugo mixed the fruit and calculated that his mix would cost \$5.00 per pound, which ingredient did he add more of?

2.) Dimensional Analysis practice.

a.) Write 36 minutes in hours as a decimal.

b.) Write 54 minutes in hours as a fraction.

c.) Write 4 hours and 20 minutes as minutes.

d.) Write 4.2 hours as hours and minutes.

e.) Find the number of feet (round to the nearest thousandth) in 248 centimeters [2.54 cm = 1 inch; 12 inches = 1 foot].

f.) Find the number of square inches in 4 square feet. (Hint: draw a picture.)

g.) Find the number of square feet in 343 square inches (round to the nearest thousandth).

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## Mth 65 Required Course Supplement

### Mth 65 Supplement Key

#### §4.3

1.) The simplified system is 
$$\begin{cases} y = 2x + 1 \\ y = -\frac{2}{3}x + \frac{25}{3} \end{cases}$$

The solution to the system is  $\left(\frac{11}{4}, \frac{13}{2}\right)$ .

#### §4.4

1.)a.) No, it's not possible. The cheapest mix he could possibly make is made entirely of pineapple and would cost \$3.99 per pound. Even if you add a tiny amount of mango, it would raise the price.

b.) The cost of \$4.80 per pound is closer to \$3.99 than \$5.99. This means that more of the pineapple was added than mango.

c.) He added 5 pounds of mango and no pineapple at all.

d.) The cost of \$5.00 per pound is closer to \$5.99 than \$3.99. This means he added more mango than pineapple.

2.) Dimensional Analysis practice.

a.)  $36 \text{ min} \cdot \frac{1 \text{ hr}}{60 \text{ min}} = \frac{36}{60} \text{ hr} = 0.6 \text{ hr}$

b.)  $54 \text{ min} \cdot \frac{1 \text{ hr}}{60 \text{ min}} = \frac{54}{60} \text{ hr} = \frac{9}{10} \text{ hr}$

c.)  $4 \text{ hr} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = 240 \text{ min}$ . So, 4hr20min is 260min.

d.)  $0.2 \text{ hr} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = 12 \text{ min}$ . So 4.20hr is 4hr12min.

e.)  $248 \text{ cm} \cdot \frac{1 \text{ in}}{2.54 \text{ cm}} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \approx 8.136 \text{ ft}$

f.)  $4 \text{ ft}^2 \cdot \frac{12 \text{ in}}{1 \text{ ft}} \cdot \frac{12 \text{ in}}{1 \text{ ft}} = 576 \text{ in}^2$

g.)  $343 \text{ in}^2 \cdot \frac{1 \text{ ft}}{12 \text{ in}} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \approx 2.382 \text{ ft}^2$