Algebra 1R – Mr. Bo
Unit 6+7 – Day 3 Notes

Name:_____
Date: _____

Systems of Equations – Mixed Practice

Problem 1 – Milking Cows

Initial Quantity.

Wesley owns a dairy farm. In the morning, it takes him 0.3 hour to set up for milking the cows. Once he has set up, it takes Wesley 0.2 hour to milk each cow by hand. He is contemplating purchasing a milking machine in hopes that it will speed up the milking process. The milking machine he is considering will take 0.4 hour to set up each morning and takes 0.05 hour to milk each cow.

Rate.

$y = mx + b$

Problem 2 – Free Fragrance

Rika works in the perfume department at Hoover's Department Store. She is giving away samples of a new fragrance and a new scented hand lotion to customers that pass by her station. She is required to hand out a total of 114 samples during her shift. She has already handed out 36 samples, which represents $\frac{1}{3}$ of the number of fragrance samples and $\frac{1}{4}$ of the number of hand lotion samples that she must hand out.

Total

$ax + by = C$

1. Analyze the two problems above. How are they the similar? How are they different?

Similars: Both problems contain 2 quantities.

Difference: Prob 1 has a rate, Prob. 2 does not. Prob. 1 has an intial Quanity. In prob 2. the 2 Quantities add to a total.

2. Write a system of equations to describe each scenario. Remember to define your variables.

Milking Cows

X = # of cows
y = # of hours

$y = 0.2x + 0.3$

$y = 0.05x + 0.4$

Free Fragrance

X = perfume samples
y = # Lotion samples.

$x + y = 114$

$\frac{1}{3}x + \frac{1}{4}y = 36$

3. For each system, describe which method for solving (graphing, substitution, linear combinations) would most likely be the best way to solve the system.

Milking: Substitution because y is alone already. :)

Fragrance: Elimination because the equations are in standard form. (x and y on the same side)

4. Solve each system either by substitution or linear combinations.

Milking Cows

$\begin{cases} y = 0.2x + 0.3 \\ y = 0.05x + 0.4 \end{cases}$

$0.05x + 0.4 = 0.2x + 0.3$

$-0.05x \qquad -0.05x$

$0.4 = 0.15x + 0.3$

$-0.3 \qquad -0.3$

$\frac{0.1}{0.15} = \frac{0.15x}{0.15}$

$x = 0.7$ cows.

$y = 0.2(0.7) + 0.3$

$= .44$ hours.

Free Fragrance

$x + y = 114$

$12\left(\frac{1}{3}x + \frac{1}{4}y = 36\right)$

$\Downarrow$

$-4(x + y = 114)$

$4x + 3y = 432$

$\Downarrow$

$-4x - 4y = -456$

$4x + 3y = 432$

$-y = -24$

$y = 24$ Lotion samples

$x + 24 = 114$

$x = 90$ fragrance samples.

Problem 3 – DVD Subscription

Antonio wants to subscribe to a service that will allow him to rent DVDs and stream movies online. Movie Madness offers a subscription for $14.25 a month. With this subscription, Antonio will receive one DVD at a time and can check out as many DVDs as he wants each month. However, he must pay $1.40 for each movie he streams online. The Show Must Go On! offers a subscription for $8.50 a month. With this subscription, Antonio will receive one DVD at a time and can checkout as many DVDs as he wants each month. However, he must pay $3.25 for each movie he streams online.

1. Write a system of equations to describe the scenario. Define your variables.

x = # movies Streamed per month.

y = Cost per month. (total)

Movie madness: $y = 1.40x + 14.25$

Show must go on: $y = 3.25x + 8.50$

2. Solve the system either by substitution or linear combinations.

$1.40x + 14.25 = 3.25x + 8.50$

$-1.40x \qquad -1.40x$

$14.25 = 1.85x + 8.50$

$-8.50 \qquad -8.50$

$\frac{5.75}{1.85} = \frac{1.85x}{1.85}$

$x = 3.12$ movies

$y = 1.4(3.13) + 14.25 = \$18.62$