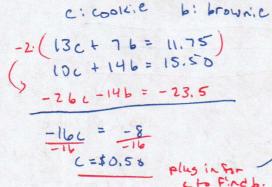Algebra 2 – System of Equations Word Problems

Name: _____ Hour: _____

Tips on modeling.

1. Decide what your variables will be first
2. Remember that you are trying to form multiple equations. As soon as you read something that involves your variables, see if you can make an equation out of it.

Model and Solve the following systems of equations.

1. Chelsea and Roberto each sell baked goods for their club's fundraiser. Chelsea sells 13 cookies and 7 brownies and collects a total of $11.75. Roberto sells 10 cookies and 14 brownies and collects a total of $15.50. How much did they charge for the cookies and the brownies?

c: cookie   b: brownie

$-2 \cdot (13c + 7b = 11.75)$
$10c + 14b = 15.50$

$-26c - 14b = -23.5$
_____
$\dfrac{-16c}{-16} = \dfrac{-8}{-16}$

$c = \$0.50$ plus in for
 c to find b.

$10(0.5) + 14b = 15.50$
$5 + 14b = 15.50$
$-5 -5$
$\dfrac{14b}{14} = \dfrac{10.50}{14}$
$b = \$0.75$

$\boxed{\text{cookie} : \$0.50 \\ \text{Brownie} : \$0.75}$

2. Mattie wants to plant some flowers in her yard. She has space for 15 plants. She buys pansies and daisies at her local garden center. The pansies are each $2.75 and the daisies are each $2.00. How many of each does she buy if she spends a total of $35.25?

p: pansies   d: daisies

$-2 \cdot (p + d = 15)$
$2.75p + 2d = 35.25$

$-2p - 2d = -30$
_____
$\dfrac{.75p}{.75} = \dfrac{5.25}{.75}$

$p = 7$
$7 + d = 15$
$d = 8$

$\boxed{\text{Mattie bought} \\ 7 \text{ pansies } \& \\ 8 \text{ daisies}}$

3. A one pound mix consisting of 30% cashews and 70% pistachios sells for $6.25. A one pound mix consisting of 80% cashews and 20% pistachios sells for $7.50. How much would a mix consisting of 50% of each type of nut sell for?

c: cashews   p: pistachios

$-.8 (.3c + .7p = 6.25)$
$.3 (.8c + .2p = 7.50)$

$-.24c - .56p = -5$
$+ .24c + .06p = 2.25$
_____
$\dfrac{-.5p}{-.5} = \dfrac{-2.75}{-.5}$

$p = \$5.50$

$.8c + .2(5.50) = 7.50$
$.8c + 1.1 = 7.50$
$ -1.1 -1.1$
$\dfrac{.8c}{.8} = \dfrac{6.4}{.8}$
$c = \$8.00$

$.5c + .5p = ?$
$.5(8) + .5(5.5) =$
$\boxed{\$6.75}$

4. The Robinson family pays $19.75 at the movie theater for 3 medium popcorns and 4 medium drinks. The Jamison family pays $33.50 at the same theater for 5 medium popcorns and 7 medium drinks. How much would it cost for a couple to get 2 medium drinks and 2 medium popcorns?

p: popcorn   d: drink

$-5 \cdot (3p + 4d = 19.75)$
$3 \cdot (5p + 7d = 33.50)$

$-15p - 20d = -98.75$
$15p + 21d = 100.5$

$1d = \$1.75$
plug that in to find p

$3p + 4(1.75) = 19.75$
$3p + 7 = 19.75$
$3p = 12.75$

$p = \$4.25$

$2d + 2p = ?$
$2(1.75) + 2(4.25) =$
$\boxed{\$12}$

5. A cell phone company charges extra when users exceed their included call time and text message limits. One user paid $3.24 extra having talked for 240 extra minutes and sending 12 additional texts. A second user talked for 120 extra minutes and sent 150 additional texts and was charged $4.50 above the regular fee. How much extra would a user be charged for talking 140 extra minutes and sending 200 additional texts?

m: minutes   t: texts

$240m + 12t = 3.24$
$-2(120m + 150t = 4.50)$

$240m + 12t = 3.24$
$-240m - 300t = -9$
$-288t = -5.76$

$t = \$0.02$
plug in to find m

$120m + 150(.02) = 450$
$120m + 3 = 4.50$
$120m = 1.50$
$m = \$.0125$

$140m + 200t$
$140(.0125) + 200(.02)$
$\boxed{\$5.75}$

6. A mix of 35% almonds and 65% peanuts sells for $5.70. A mix of 75% almonds and 25% peanuts sells for $6.50. How much should a mix of 60% almonds and 40% peanuts sell for?

a: almond   p: peanut

$-.75(.35a + .65p = 5.70)$
$.35(.75a + .25p = 6.50)$

$.75a + .25(5.00) = 6.50$
$.75a + 1.25 = 6.50$
$a = \$7.00$

$-.2625a - 0.4875p = -4.275$
$.2625a + .0875p = 2.275$
$-.4p = -2$
$p = \$5.00$

$.6a + .4p =$
$.6(7.00) + .4(5.00)$
$\boxed{\$6.20}$

7. Jack and James each buy some small fish for their new aquariums. Jack buys 10 clownfish and 7 goldfish for $28.25. James buys 5 clownfish and 6 goldfish for $17.25. How much does each type of fish cost?

c: clownfish   g: goldfish

$10c + 7g = 28.25$
$-2(5c + 6g = 17.25)$

$10c + 7g = 28.25$
$-10c - 12g = -34.5$
$-5g = -6.25$
$g = \$1.25$

$10c + 7(1.25) = 28.25$
$10c + 8.75 = 28.25$
$10c = 19.5$
$c = \$1.95$

goldfish : $1.25
clownfish : $1.95