Teaching Notes For Algebra I
Homework #7

Overview: In this lesson, students will learn how to set up and solve distance word problems and mixture problems.

Preparation: Watch videos on "bucket problems" and "distance problems."

Classroom Examples:

1) How much 32% acid solution needs to be mixed with 30 gallons of an 85% acid solution to get a 42% acid solution?

$$32\%(x)+85\%(30)=42\%(x+30)$$

$$.32x+.85(30)=.42(x+30)$$

$$.32x+25.5=.42x+12.6$$

$$25.5=.1x+12.6$$

$$12.9=.1x$$

$$129=x$$

2) How much 68% acid solution needs to be mixed with some 12% acid solution to get 175 gallons of a 60% acid solution?

$$68\%(x)+12\%(175-x)=60\%(175)$$

$$.68x+.12(175-x)=.6x(175)$$

$$.68x+21-.12x=105$$

$$.56x+21=105$$

$$.56x=84$$

$$x=150$$

3) How much pure water needs to be mixed with 80 gallons of a 28% acid solution to get a 20% acid solution?

$$0\%(x)+28\%(80)=20\%(x+80)$$

$$0x+.28(80)=.2(x+80)$$

$$22.4=.2x+16$$

$$6.4=.2x$$

$$32=x$$

Teaching Notes For Algebra I
Homework #7

4) How much pure acid must be mixed with 60 gallons of a 36% acid solution to get an 80% acid solution?

$$100\%(x)+36\%(60)=80\%(x+60)$$
$$1x+.36(60)=.8(x+60)$$
$$1x+21.6=.8x+48$$
$$.2x+21.6=48$$
$$.2x=26.4$$
$$132=x$$

5) How much chocolate that costs $9 per pound should you mix with 12 lbs. of raisins that costs $4.50 per pound to get a mixture worth $7.50 per pound?

$$\$9(x)+\$4.50(12)=\$7.50(x+12)$$
$$9(x)+4.5(12)=7.5(x+12)$$
$$9x+54=7.5x+90$$
$$1.5x+54=90$$
$$1.5x=36$$
$$x=24$$

6) A theater sold 235 tickets and its gross receipts for the night totaled $1,534. Adult tickets cost $9, senior tickets cost $7 and kid tickets cost $4. If twice as many senior tickets were sold than adult tickets, how many of each type were sold?

Adult	Senior	Kid
x	$2x$	$235-x-2x$

$$\$9(x)+\$7(2x)+\$4(235-3x)=1534$$
$$9x+14x+940-12x=1534$$
$$11x+940=1534$$
$$11x=594$$
$$x=54$$

54 adult, 108 senior, and 73 kid

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7) Hannah has $6.43 in pennies, nickels, and quarters. If she has 3 times as many quarters as nickels and 5 less pennies than she has nickels, how many of each type of coin does she have?

Quarters	Nickels	Pennies
$3x$	x	$x-5$

$$\$.01(x-5)+\$.05(x)+\$.25(3x)=\$6.43$$
$$.01(x-5)+.05(x)+.25(3x)=6.43$$
$$.01x-.05+.05x+.75x=6.43$$
$$.81x-.05=6.43$$
$$.81x=6.48$$
$$x=8$$

8 nickels, 24 quarters, and 3 pennies

8) Jackie leaves the school at 10am travelling east at a speed of 58mph. Jen leave the school at 8am travelling west at a speed of 67mph. What time of day will it be when they are exactly 759 miles apart?

$$58(x)+67(x+2)=759$$
$$58x+67x+134=759$$
$$125x+134=759$$
$$125x=625$$
$$x=5 \text{ hours}$$
3pm

9) Natalie leaves the church at 4pm headed towards Hackettstown doing 63mph. Alex leaves the church at 6pm going 81mph chasing after her. What time of day will it be when Alex catches Natalie?

$$63(x)=81(x-2)$$
$$63x=81x-162$$
$$-18x=-162$$
$$x=9 \text{ hours}$$
1 am

10) Andrew leaves his house at 9am heading north doing 54 mph while Kim leaves Andrew's house at 10am doing 61mph chasing after Andrew. What time of day will it be when Kim is 16 miles ahead of Andrew?

$$54(x) + 16 = 61(x-1)$$

$$54x + 16 = 61x - 61$$

$$16 = 7x - 61$$

$$77 = 7x$$

$$11 \text{ hours} = x$$

8 pm