2.7 Word Problems--> Day 2

1. A gum ball machine contains only quarters and dimes. There are 28 coins whose total value is $5.35. How many quarters are there?

Let q be # quarters
Let d be # dimes

① $q + d = 28$
② $0.25q + 0.1d = 5.35$

Substitution!

From ① $q + d = 28$
$q = 28 - d$

Sub into ②

$0.25(28-d) + 0.1d = 5.35$
$7 - 0.25d + 0.1d = 5.35$
$7 - 0.15d = 5.35$
$-0.15d = -1.65$
$d = \frac{-1.65}{-0.15}$
$d = 11$

Sub $d = 11$ into ①
$q + 11 = 28$
$q = 17$

∴ There are 17 quarters

2. Moira invested $800. Part of the money was in a term deposit that paid 6% per annum, the rest was in an account earning 4% per annum. After one year she had earned $42 interest. How much did she invest at each rate?

Let x be the amount invested at 6%
Let y be the amount invested at 4%

① $x + y = 800$
② $0.06x + 0.04y = 42$

Elimination! (Either strategy is good)

① × 0.06 $0.06x + 0.06y = 48$
② $-\ 0.06x + 0.04y = 42$
$0.02y = 6$
$y = \frac{6}{0.02}$
$= 300$

Sub $y = 300$ into ①
$x + 300 = 800$
$x = 500$

Moira invested $500 @ 6%
" " $300 @ 4%

3. Sheldon is asked to make 200 mL of 48% alcohol solution to pass his chemistry course! He is given a 40% and 60% alcohol solutions and asked to mix them in order to get the right solution. Help poor Sheldon... How many milliliters of each must he use?

Let x be mL of 40%

Let y be mL of 60%

① $x + y = 200$

② $0.4x + 0.6y = 0.48(200)$

Substitution

From ① $x = 200 - y$

Sub into ②

$0.4(200-y) + 0.6y = 0.48(200)$

$80 - 0.4y + 0.6y = 96$

$0.2y = 16$

$y = 80$

Sub into ①

$x + 80 = 200$

$x = 120$

∴ Sheldon needs 120mL@40%
80mL@60%

4. How many kg of 30% salt solution by mass and 40% salt solution by mass should be mixed to form 400 kg of 37% salt solution by mass?

Let x be kg of 30%

Let y " " " 40%

① $x + y = 400$

② $0.3x + 0.4y = 0.37(400)$

Substitution

From ① $x = 400 - y$

Sub into ②

$0.3(400-y) + 0.4y = 148$

$120 - 0.3y + 0.4y = 148$

$0.1y = 28$

$y = 280$

Sub into ①

$x = 400 - 280$

$= 120$

∴ 120 kg of 30%
280 kg of 40%

Homework:

Set 1: p.18 #12,16 p.46 #3,12,15

Set 2: p.18 #12,16 p.46 #12,15,16