

System Word Problems #2 Money, Mixtures and %'s

Let's start with a boring number question

1) Two Numbers differ by 72. The larger number is 8 less than 3 times the smaller number. Find the numbers:

Step 1: Equations ($x =$ larger number)

Two Numbers **differ** by 72.

$$x - y = 72$$

The larger number **is** 8 less than 3 times the smaller number

$$x = 3y - 8 \quad \text{sub this in}$$

$$(3y - 8) - y = 72$$

$$2y - 8 = 72$$

$$2y = 80$$

$$y = 40$$

$$x = 3(40) - 8$$

$$x = 112$$

\$ Problem

2) Bruce has \$72.15 in nickels and dimes in his Chuck Norris piggy bank. There are 24 more nickels than dimes. How many of each type of coin does he have?

We need an equation for amount of \$

$$\text{dimes} = 0.1 \quad \text{nickels} = 0.05$$

$$0.1d + 0.05n = 72.15$$

We need an equation for # of coins

$$24 \text{ more } n\text{'s than } d\text{'s}$$

$$n = d + 24 \quad \text{sub this in}$$

$$0.1d + 0.05(d + 24) = 72.15$$

$$0.1d + 0.05d + 1.2 = 71.15$$

→

$$0.15d = 70.85$$

$$d = 473$$

$$n = 473 + 24$$

$$n = 497$$

% Problem

3) Ilsa scored 75% on the multiple-choice part of a recent test and 95% on the written part of the test. Her final mark was 111.5 out of a possible 130 marks. What were each part of the test out of?

We need an equation for the % = score

$$0.75M + 0.95W = 111.5$$

We need an equation for the # of questions

$$M + W = 130$$

$W =$ written $M =$ Multiple choice

$$0.75M + 0.95W = 111.5$$

$$- \quad \underline{0.75M + 0.75W = 97.5}$$

$$0.20W = 14$$

Written 70 marks

$M = 60$ marks

MIXTURE PROBLEM

A mixture problem is a problem where you mix 2 things to make:
a certain amount with a certain % (or value)

4) A chemist has one beaker full of liquid that is 20% acid and another that is 56% acid. The chemist wants to make a 600 ml liquid that is 35% acid. How much of each type should they mix together?

We need an equation for total amount

We need an equation for the % = %

W = weak acid T = strong (tuff) acid

$$W + T = 600$$

$$0.2W + 0.56T = 0.35(600)$$

 % of total

$$0.2W + 0.56T = 210$$

$$- \quad \underline{0.2W + 0.2T = 120}$$

$$0.36 T = 90$$

$$T = 250 \text{ ml}$$

$$\text{so } W = 350 \text{ ml}$$

5) A Butcher has 2 vats of beef. One vat is extra lean 8% fat and the other is 35% fat. The butcher needs to make up a 40 kg lean batch of 24% fat. How much of each should he mix?

We need an equation for total amount

We need an equation for the % = %

L = lean F = fatty

$$L + F = 40$$

$$0.08L + 0.35F = 0.24(40)$$

 % of total

$$0.08L + 0.35F = 9.6$$

$$- \quad \underline{0.08L + 0.08F = 3.2}$$

$$0.27 F = 4.4$$

$$F = 16.3 \text{ kg so } L = 23.7 \text{ kg}$$

6) Juan has 2 types of coffee. Premium that he can sell for \$16 per kilogram and low grade that he can only sell for \$5.50 per kilogram. He plans to create 50 kilograms that he can sell for \$10.00 per kilogram. How much of each type should he use?

We need an equation for total amount

We need an equation for the \$

P = premium L = low grade

$$P + L = 50$$

$$16P + 5.50L = 10(50)$$

$$16P + 5.50L = 500$$

$$- \underline{16P + 16L = 800}$$

$$-10.5L = -300$$

$$L = 28.57 \text{ kg so } P = 21.43 \text{ kg}$$

Assignment = worksheet (text questions included on worksheet)

6) *Do Page 426 #17*

7) *A butcher has 2 types of steak that he will ground up into hamburger for some sweet succulent cheese burgers. Type 1 costs \$5.60 a pound and type 2 costs \$2.40 a pound. How much of each should he mix together so that he has 100 pounds selling for \$4.00 /pound?*

8) *A vending machine contains \$5.20 in dimes and quarters. The number of quarters is 4 more than twice the number of dimes. How many of each type of coin is in the machine?*

9) *Do Page 425 #10 (Polar bears)*

10) *Do Page 438 #17*

Need a challenge? Do Page 427 #24