

KEY

Name _____
Advanced Algebra (H) - Pitfalls in Problem Solving

Solve each of the following by writing and solving an algebraic equation. BE NEAT!! Define your variables!! Show all work.

1. Find three consecutive integers such that the square of the second integer increased by the square of the third integer equals six times the first integer increased by 21.

Let x = the first integer

$x + 1$ = the second integer

$x + 2$ = the third integer

$$(x+1)^2 + (x+2)^2 = 6x + 21$$

$$x^2 + 2x + 1 + x^2 + 4x + 4 = 6x + 21$$

$$2x^2 + 6x + 5 = 6x + 21$$

$$2x^2 - 16 = 0$$

$$x^2 - 8 = 0$$

$$x^2 = 8$$

$$x = 2\sqrt{2}$$

← checks out but not ^{an} integer

So, { }

2. A coin bank contains twice as many nickels as quarters, four times as many pennies as quarters and no dimes. If the bank contains \$7.60, how many of each coin does it contain?

let q = # qtrs $\rightarrow .25q$ = value

$2q$ = # nickels $\rightarrow .05(2q)$ = value

$4q$ = # pennies $\rightarrow .01(4q)$ = value

$$.25q + .10q + .04q = 7.60$$

$$39q = 760$$

$$q = 19.487 = 19\frac{19}{39}$$

So, { }

3. Wayne is building a shed in his backyard to store his snowmobile. Value Hardware sells 3-in. finishing nails for \$ 0.99/lb. and 2-in. finishing nails for \$1.39/lb. Wayne needs 5 lbs. of nails. If his bill totals \$6.15, how many pounds of each size did he buy?

let x = # of lbs. of 3"

$.99x$ = value of "

y = # of lbs. of 2"

$1.39y$ = value of 2"

$$\begin{cases} x + y = 5 \\ .99x + 1.39y = 6.15 \end{cases}$$

$$y = 5 - x$$

$$.99x + 1.39(5 - x) = 6.15$$

$$x = 2$$

2 lbs. at \$0.99
3 lbs. at \$1.39

checks out!

4. Nan and Peg were traveling to NYC to attend a conference. They were unable to buy seats on the same train. Nan left at 10 am and her train traveled at 68 mph. Peg left from the same station but at 11:30 am. Her train traveled 60 mph. At what time did the train that Peg was on catch up to the train Nan was on?

let $x = \#$ of hrs

$68x = \text{Nan's distance in } x \text{ hrs.}$

$60(x - 1.5) = \text{Peg's distance}$

↑
for leaving $1\frac{1}{2}$ hrs. later

$$68x = 60(x - 1.5)$$

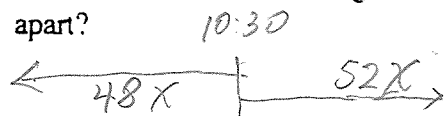
$$68x = 60x - 90$$

$$8x = -90$$

$$x = -11.25$$

So, { }

5. At 10:30 am two cars pass each other as they travel in opposite directions along a straight highway. If one car averages 48 mi/hr and the other 52 mi/hr, at what time will they be 25 miles apart?



let $x = \#$ of hrs.

$48x = \text{distance of car in } x \text{ hrs}$

$52x = \text{distance " " " "}$

$$48x + 52x = 25$$

$$100x = 25$$

$$x = \frac{1}{4}$$

checks out!

At 10:45 AM

6. A store sells the Red Dot golf balls for 60¢ each, the Black Dot ball for 94¢ each and the Gold Dot ball for \$1.10 each. A golf pro bought two dozen more Red Dot than Gold Dot balls and three times as many Black Dot as Red Dot balls. If the golf balls and one dollar's worth of tees cost \$140.50, how many golf balls of each kind were bought?

let $R = \#$ red $\rightarrow .60R = \text{cost of reds}$

$R - 24 = \#$ gold $.94(R - 24) = \text{cost of gold}$

$3R = \#$ black $1.10(3R) = \text{cost of black}$

$$.60R + .94(R - 24) + 1.10(3R) + 1 = 140.50$$

$$4.84R = 162.06$$

$$R \approx 33.48347107$$

{ }