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**QUIZ #1 @ 85 points**

Write in a neat and organized fashion. Write your complete solutions on SEPARATE PAPER. You should use a pencil. For an exercise to be complete there needs to be a detailed solution to the problem. Do not just write down an answer. No proof, no credit given! Clearly label each exercise.

1. Give two numbers between -10 and 10 that satisfy each given condition:

a) integer numbers

b) irrational numbers

c) rational numbers but not integers

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2. Simplify the following expressions:

a)  $-8(2y-1) + \frac{1}{2}(6-4y) - y + 1$

b)  $7 - 5[x - 2(x+1)]$

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3. Solve the following equations .

a)  $3(p-1) - (2-p) + 5 = 0$

b)  $-5(2m+3) - 4m = 8m + 27$

f)  $\frac{y+7}{5} = \frac{1-3y}{4}$

c)  $\frac{1}{6}y - 5 = -\frac{5}{6}y$

g)  $2x + 3y = 5$  solve for  $y$ .

d)  $11x - 5(x+2) = 6x + 5$

h)  $V = \frac{1}{3}pr^2h$  solve for  $h$

e)  $-\frac{1}{4}(x-12) + \frac{1}{2}(x+2) = x+4$

i)  $0.1(x+80) + 0.2x = 14$

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5. A certain metal is 20% tin. How many kilograms of this metal must be mixed with 80 kg of a metal that is 70% tin to get a metal that is 50% tin?

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6. The longest side of a triangle is 3 ft longer than the shortest side. The medium side is 1 ft longer than the shortest side. If the perimeter of the triangle is 16 ft, what are the lengths of the three sides?

# Quiz #1

(1) For example,

(a)  $-3$  and  $5$

(b)  $-\sqrt{2}$  and  $\sqrt{6}$

(c)  $2.1$  and  $\frac{2}{3}$

(2) (a)  $-8(2y-1) + \frac{1}{2}(6-4y) - y + 1$   
 $= -16y + 8 + 3 - 2y - y + 1$   
 $= \boxed{-19y + 12}$

(b)  $7 - 5[x - 2(x+1)] =$   
 $= 7 - 5(x - 2x - 2)$   
 $= 7 - 5(-x - 2)$   
 $= 7 + 5x + 10$   
 $= \boxed{5x + 17}$

(3) (a)  $3(p-1) - (2-p) + 5 = 0$   
 $3p - 3 - 2 + p + 5 = 0$   
 $4p = 0 \Rightarrow p = 0$   
 $\boxed{p \in \{0\}}$

(b)  $-5(2m+3) - 4m = 8m+27$   
 $-10m - 15 - 4m = 8m + 27$   
 $-14m - 15 = 8m + 27$   
 $-14m - 8m = 27 + 15$   
 $-22m = 42$   
 $m = \frac{42}{-22} = \frac{21}{-11}$   
 $\boxed{m \in \left\{-\frac{21}{11}\right\}}$

(c)  $\frac{1}{6}y - 5 = -\frac{5}{6}y$

$\frac{1}{6}y + \frac{5}{6}y = 5$

$y = 5 \Rightarrow \boxed{y \in \{5\}}$

(d)  $11x - 5(x+2) = -6x + 5$

$11x - 5x - 10 = 6x + 5$

~~$6x - 10 = 6x + 5$~~

$-10 = 5$  Contradiction

$\Rightarrow$  no solutions

$\boxed{x \in \emptyset}$

(e)  $-\frac{1}{4}(x-12) + \frac{1}{2}(x+2) = x+4$

LCO = 4

$-\frac{(x-12)}{4} + \frac{2(x+2)}{4} = \frac{4(x+4)}{4}$

$-(x-12) + 2(x+2) = 4(x+4)$

$-x + 12 + 2x + 4 = 4x + 16$

~~$x + 16 = 4x + 16$~~

$x = 4x$

$x - 4x = 0$

$-3x = 0 \Rightarrow x = 0$

$\boxed{x \in \{0\}}$

(f)  $\frac{y+7}{5} = \frac{1-3y}{4}$

Cross-product property  $\Rightarrow$

$4(y+7) = 5(1-3y)$

$4y + 28 = 5 - 15y$

$4y + 15y = 5 - 28$

$$19y = -23$$

$$y = \frac{-23}{19} \Rightarrow \boxed{y \in \left\{ \frac{-23}{19} \right\}}$$

$$(g) 2x + 3y = 5, \quad y = ?$$

$$3y = -2x + 5$$

$$\boxed{y = \frac{-2x + 5}{3}}$$

$$(h) V = \frac{1}{3} \pi r^2 h, \quad h = ?$$

$$3V = \pi r^2 h$$

$$\boxed{h = \frac{3V}{\pi r^2}}$$

$$(i) 0.1(x + 80) + 0.2x = 14$$

$$10(0.1(x + 80) + 0.2x) = 10 \cdot 14$$

$$(x + 80) + 2x = 140$$

$$x + 80 + 2x = 140$$

$$3x + 80 = 140$$

$$3x = 140 - 80$$

$$3x = 60 \Rightarrow x = \frac{60}{3} = 20$$

$$\boxed{x \in \{20\}}$$

$$(5) \begin{matrix} 20\% \text{ tin} & 70\% \text{ tin} & 50\% \text{ tin} \\ \boxed{x \text{ kg}} & + \boxed{80 \text{ kg}} & = \boxed{x + 80} \\ & & \text{kg} \end{matrix}$$

let  $x$  = number of kg of the 20% tin

$$\text{then, } 20\% x + 70\% (80) = 50\% (x + 80)$$

$$\frac{20}{100} x + \frac{70}{100} \cdot 80 = \frac{50}{100} (x + 80)$$

multiply both sides by 100

$$20x + 70(80) = 50(x + 80)$$

$$20x + 5600 = 50x + 4000$$

$$5600 - 4000 = 50x - 20x$$

$$1600 = 30x$$

$$x = \frac{1600}{30} = \frac{160}{3} = 53\frac{1}{3} \text{ kg}$$

we should mix  $53\frac{1}{3}$  kg of the 20% tin

(6) Example textbook!  
let  $x$  = length of shortest side  
then  $x + 3$  = length of longest side  
then  $x + 1$  = length of medium

$$\text{Perimeter} = 16 \text{ ft}$$

$$x + (x + 3) + (x + 1) = 16$$

$$x + x + 3 + x + 1 = 16$$

$$3x + 4 = 16$$

$$3x = 16 - 4$$

$$3x = 12 \Rightarrow x = 4 \text{ ft}$$

The sides are:

4 ft - shortest

5 ft - medium

7 ft - longest