

QUIZ #1 @ 80 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. Simplify the following expressions:

a) $-2(3t-4)-(6-t)+2t-5$

b) $5-2[x-3(x-2)]$

2. Solve the following equations

a) $-\frac{5}{6}x-(x-1)=\frac{1}{4}(80-x)$

b) $9(a+1)-3a=2(3a+1)-8$

c) $\frac{2y+7}{3}=\frac{y-1}{4}$

d) $y=mx+b$ solve for x .

3. Solve the following inequalities. Graph the solution set. Write the solution set using interval notation.

a) $1 \leq 3 + \frac{2}{3}t < 7$

b) $3x - (6x+1) \leq 8x + 2(x-3)$

4. How many liters of a 10% alcohol solution must be mixed with 40 liters of a 50% solution to get a 40% solution?

Quiz 1 - SOLUTIONS

$$\begin{aligned} (1a) \quad & -2(3t-4) - (6-t) + 2t-5 = \\ & = -6t + 8 - 6 + t + 2t - 5 \\ & = \boxed{-3t - 3} \end{aligned}$$

$$\begin{aligned} (b) \quad & 5 - 2[X - 3(x-2)] = \\ & = 5 - 2(X - 3x + 6) \\ & = 5 - 2(-2x + 6) \\ & = 5 + 4x - 12 \\ & = \boxed{4x - 7} \end{aligned}$$

$$\begin{aligned} (2a) \quad & -\frac{5}{6}x - (x-1) = \frac{1}{4}(80-x) \\ & -\frac{5}{6}x - x + 1 = \frac{1}{4}(80-x) \end{aligned}$$

$LCD(6, 4) = 12$

$$-10x - 12x + 12 = 3(80 - x)$$

$$-22x + 12 = 240 - 3x$$

$$-22x + 3x = 240 - 12$$

$$-19x = 228$$

$$x = \frac{-228}{19} = -12$$

$$\boxed{x = -12}$$

$$\begin{aligned} (b) \quad & 9(a+1) - 3a = 2(3a+1) - 8 \\ & 9a + 9 - 3a = 6a + 2 - 8 \\ & 6a + 9 = 6a - 6 \end{aligned}$$

$9 = -6$ Contradiction

There are no solutions

$$\boxed{a \in \emptyset}$$

$$(c) \quad \frac{2y+7}{3} = \frac{y-1}{4}$$

cross-product property:

$$4(2y+7) = 3(y-1)$$

$$8y + 28 = 3y - 3$$

$$8y - 3y = -3 - 28$$

$$5y = -31$$

$$\boxed{y = \frac{-31}{5}}$$

$$(d) \quad y = mx + b \quad , \quad x = ?$$

$$y - b = mx$$

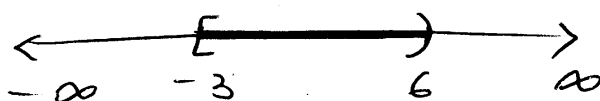
$$\boxed{x = \frac{y-b}{m}}$$

$$(3a) \quad 1 \leq 3 + \frac{2}{3}t < 7$$

$$\begin{array}{ccc} -3 & & -3 \\ \hline -2 \leq \frac{2}{3}t < 4 & & / \cdot 3 \end{array}$$

$$-6 \leq 2t < 12 \quad / \div 2$$

$$\boxed{-3 \leq t < 6}$$



$$t \in [-3, 6)$$

$$(b) 3x - (6x + 1) \leq 8x + 2(x - 3)$$

$$3x - 6x - 1 \leq 8x + 2x - 6$$

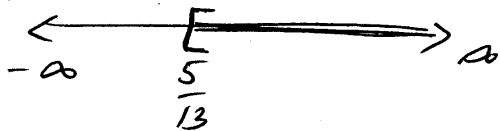
$$-3x - 1 \leq 10x - 6$$

$$-1 + 6 \leq 10x + 3x$$

$$5 \leq 13x$$

$$\frac{5}{13} \leq x$$

$$\boxed{x \geq \frac{5}{13}} \quad x \in \left[\frac{5}{13}, \infty \right)$$



$$(4) \begin{array}{ccc} 10\% & 50\% & 40\% \\ \boxed{x \text{ liters}} & + \boxed{40 \text{ liters}} & = \boxed{x + 40 \text{ liters}} \end{array}$$

Let x = the number of liters of the 10% solution

$$10\% x + 50\% (40) = 40\% (x + 40)$$

$$\frac{10}{100} x + \frac{50}{100} \cdot 40 = \frac{40}{100} (x + 40)$$

$$10x + 50(40) = 40(x + 40)$$

$$10x + 2000 = 40x + 1600$$

$$2000 - 1600 = 40x - 10x$$

$$400 = 30x$$

$$x = \frac{400}{30} = \frac{40}{3}$$

$\boxed{x = 13\frac{1}{3}}$ liters of the 10% alcohol solution