

Grade 9 Academic Math

Unit 2 - Quiz - Solving Equations / Review of Algebra

Mr. Nolfi

Victim:

Mr. Solutions

This is yet another stupendous display of mathematical prowess Mr. J.!!

KU	APP	COM
23/23	17/17	10/10

1. Solve each of the following equations. Show all steps!

(a) $-4y - 7 = -6$ (3 KU)

$$\therefore -4y - 7 + 7 = -6 + 7$$

$$\therefore -4y = 1$$

$$\therefore \frac{-4y}{-4} = \frac{1}{-4}$$

$$\therefore y = -\frac{1}{4}$$

(b) $-5a + 7 = -2a - 13$ (4 KU)

$$\therefore -5a + 7 + 2a = -2a - 13 + 2a$$

$$\therefore -3a + 7 = -13$$

$$\therefore -3a + 7 - 7 = -13 - 7$$

$$\therefore -3a = -20$$

$$\therefore \frac{-3a}{-3} = \frac{-20}{-3}$$

$$\therefore a = \frac{20}{3}$$

(c) $-2(a+7) + 5(a-3) = -7 - (a+3)$ (6 KU)

$$\therefore -2a - 14 + 5a - 15 = -7 + (-a - 3)$$

$$\therefore 3a - 29 = -a - 10$$

$$\therefore 3a - 29 + a = -a - 10 + a$$

$$\therefore 4a - 29 = -10$$

$$\therefore 4a - 29 + 29 = -10 + 29$$

$$\therefore 4a = 19$$

$$\therefore \frac{4a}{4} = \frac{19}{4}$$

$$\therefore a = \frac{19}{4}$$

2. For the given equation, complete the flowchart, solve the equation by performing operations to **both sides** and check your solution. (10 KU)

Equation	Flowchart	Solve the Equation by Performing Operations to B.S.	Check your Solution	
(a) $\frac{3}{2}x + \frac{3}{4} = \frac{9}{4}$		$\frac{4}{1}(\frac{3}{2}x) + \frac{4}{1}(\frac{3}{4}) = \frac{4}{1}(\frac{9}{4})$ $\therefore 6x + 3 = 9$ $\therefore 6x + 3 - 3 = 9 - 3$ $\therefore 6x = 6$ $\therefore \frac{6x}{6} = \frac{6}{6}$ $\therefore x = 1$	L.H.S.	R.H.S.
			$\frac{3}{2}x + \frac{3}{4}$	$\frac{9}{4}$
			$= \frac{3}{2}(1) + \frac{3}{4}$	
			$= \frac{3 \times 2}{2 \times 2} + \frac{3}{4}$	
			$= \frac{6}{4} + \frac{3}{4}$	
			$= \frac{9}{4}$	
			Since LHS = RHS, $x = 1$ is the correct solution.	

(i.e. $x = 1$ satisfies the equation)

3. Solve the following equation. Then check your solution. (10 APP)

$$-\frac{1}{2}(x+3) - \frac{3(2x-1)}{4} = -4 + \frac{5}{4}x \quad (\text{The solution is } x=1.)$$

$$\begin{aligned} \therefore \left(\frac{1}{2}\right)\left(-\frac{1}{2}\right)(x+3) - \frac{3}{4}\left[\frac{3(2x-1)}{4}\right] &= 4(-4) + \frac{5}{4}x \\ \therefore -\frac{1}{4}(x+3) - \frac{9(2x-1)}{16} &= -16 + \frac{5}{4}x \\ \therefore -2(x+3) - 3(2x-1) &= -16 + 5x \\ \therefore -2x-6-6x+3 &= -16+5x \\ \therefore -8x-3 &= -16+5x \\ \therefore -8x-3-5x &= -16+5x-5x \\ \therefore -13x-3 &= -16 \\ \therefore -13x-3+3 &= -16+3 \\ \therefore -13x &= -13 \\ \therefore \frac{-13x}{-13} &= \frac{-13}{-13} \rightarrow x=1 \end{aligned}$$

Left-hand Side	Right-hand Side
$-\frac{1}{2}(x+3) - \frac{3(2x-1)}{4}$	$-4 + \frac{5}{4}x$
$= -\frac{1}{2}(1+3) - \frac{3(2(1)-1)}{4}$	$= -4 + \frac{5}{4}(1)$
$= -\frac{1}{2}(4) - \frac{3(2-1)}{4}$	$= -\frac{16}{4} + \frac{5}{4}$
$= -2 - \frac{3(1)}{4}$	$= -\frac{11}{4}$
$= -\frac{8}{4} - \frac{3}{4}$	
$= -\frac{11}{4}$	

Since LHS = RHS, $x=1$ is the correct solution. (i.e. $x=1$ satisfies the equation)

4. Fully simplify the following algebraic expression. (7 APP)

$$\begin{aligned} &\frac{4096p^{17}q^5(-p^{-2}q^4)^3}{-4^3(4p^2q)^{-2}} \\ &= \frac{4096p^{17}q^5[(-1)^3(p^{-2})^3(q^4)^3]}{-4^3[4^3(p^2)^{-2}q^{-2}]} \\ &= \frac{4096p^{17}q^5(-1)p^{-6}q^{12}}{(1)(4^3)(4^{-2})p^{-4}q^{-2}} \\ &= \frac{4096(-1)p^{17}p^{-6}q^5q^{12}}{(-1)4^1p^{-4}q^{-2}} \\ &= \frac{-4096p^{11}q^{17}}{-4p^{-4}q^{-2}} \\ &= 1024p^{15}q^{19} \end{aligned}$$

Bonus Puzzle! +2 BONUS

Where would you put the number 10 in the grid? Explain! zero spaces

1	4		6	8	5	6
2	spaces		6	spaces	8	7
one space		5			spaces	8
3	5	spaces		7	spaces	2
two spaces	three spaces					
4			7		9	

The number of empty boxes between two consecutive integers is one less than the smaller of the two integers. For example, there are no empty boxes between one and two and there are four empty boxes between five and six. This pattern exists in the direction shown by the arrows, that is, up and down the columns in an alternating fashion.



Psst, Carlos, where will you put the 10?

In my wallet, of course, Angus.

