Name: _____ Date: _____ Hour: _____

Unit 1 Day 15: Solving Multi-Step Equations Practice

Focus Question: What order do I do all of these skills in?

A. Solving the most daunting equations…

1. Which did we learn first, simplify or solve? Simplify
2. The five skills we have learned are listed in the box at the right, which two help you simplify expressions?
   Distribute
   Combine like terms
3. The remaining three steps help you Solve an equation and should be done in order.

Add/subtract the constant
Distribute
Multiply/divide the coefficient
Combine like terms
Get variables on one side only

When solving an equation (isolating a variable) you may have to perform as few as one of the steps in the box at right or as many as all of them. In the numbered blanks below, write the order in which the steps should be completed if all steps are required.

Steps to Simplify
- 1st: Distribute (multiplication)
- 2nd: Combine like terms

Steps to Solve
- 3rd: Get variables on one side only
- 4th: add/subtract the constant
- 5th: Multiply/divide the coefficient

B. Practice: Solve each equation **on your own paper**. Your answers will help you finish the sentence

"All my life I thought air was free…"

U	N	T	I	L	I	B	O	U	G	H	T	A	B	A	G
11	12	3	14	8	14	1	2	11	10	7	3	13	1	13	10

O	F	C	H	I	P	S	!
2	4	6	7	14	5	9	

We will do two together, two as rally coach and then you will continue with your partner as needed.

1. $2(x+7)+x=20$

   $x=2$ B

2. $2(2x-3)=-(1+x)$

   $x=1$ O

A

3. $3(m+1)-2m=0$

$m=-3$ T

5. $2(4x+6)-8x=6$

$x=$ ~~Ø~~ P

7. $0=3(2x-6)$

$x=3$ H

9. $\frac{2}{3}x+\frac{1}{4}=2x-\frac{5}{12}$

$x=\frac{1}{2}$ S

B

4. $6\left(\frac{4}{3}z+\frac{1}{2}\right)+z=6$

~~$z=$~~ $z=\frac{1}{3}$ F

6. $4(n+2)=2n$

$n=-4$ C

8. $10x-5(2x-4)=20$

$x=\infty$ L

10. $2(3x-1)+2(4x+5)=8$

$x=0$ G

45 = A

2 = B

-4 = C

1/3 = F

0 = G

3 = H

3.19 = I

∞ = L

13 = N

1 = O

Ø = P

½ = S

-3 = T

18 = U

11. A gym charges a $50 activation fee and $17 per month for a membership. If you spend $356, for how many months do you have a gym membership?

Makes the equation *17m + 50 = 356*

18 months U

12. Suppose you go to a concert and purchase 3 identical T-shirts and a hat. The hat cost $21 and you spend $60 in all. How much does each T-shirt cost?

Makes the equation *3t + 21 = 60*

$t=\$13$ N

13. A store had homemade sweaters on sale for $20 off the original price. Aunt Ethel jumped at the bargain and bought a sweater for all 15 members of her family. If Aunt Ethel paid $375 for all the sweaters, what was the original price of each sweater?

Makes the equation *15(p − 20) = 375*

$\$45$ A

14. After an oil pipeline burst one morning, gas prices went up by $2.20 per gallon. If that afternoon you bought 10 gallons of gas for $53.90, what was the price per gallon before the oil pipeline burst that morning?

Makes the equation *10(p + 2.2) = 53.9*

$\$3.19$/gallon I

1) $2(x+7)+x=20$

$2x+14+x=20$

$2x+x+14=20$

$3x+14=20$

$-14 \quad -14$

$\frac{3x}{3}=\frac{6}{3}$

$\boxed{x=2}$

2) $2(2x-3)=0-(1+x)$

$4x-6=-1-x$

$+x \qquad +x$

$5x-6=-1$

$+6 \quad +6$

$\frac{5x}{5}=\frac{5}{5}$

$\boxed{x=1}$

3) $3(m+1)-2m=0$

$3m+3-2m=0$

$3m-2m+3=0$

$m+3=0$

$-3 \quad -3$

$\boxed{m=-3}$

4) $6\left(\frac{4}{3}z+\frac{1}{2}\right)+2=6$

$\frac{24}{3}z+\frac{6}{2}+2=6$

$8z+3+2=6$

$8z+2+3=6$

$9z+3=6$

$-3 \quad -3$

$9z=3$

$z=\frac{3}{9}$

$\boxed{z=\frac{1}{3}}$

5) $2(4x+6)-8x=6$

$8x+12-8x=6$

$8x-8x+12=6$

$0x$ - so no solution or infinite solution (look at constants).

$\boxed{x=\varnothing}$

6) $4(n+2)=2n$

$4n+8=2n$

$-2n \quad -2n$

$2n+8=0$

$-8 \quad -8$

$\frac{2n}{2}=\frac{-8}{2}$

$\boxed{n=-4}$

7) $0 = 3(2x-6)$

$0 = 6x - 18$

$+18 \quad +18$

$\frac{18}{6} = \frac{6x}{6}$

$\boxed{3 = x}$

8) $10x - 5(2x-4) = 20$

$10x - 10x + 20 = 20$

$0x + 20 = 20$

$0x =$ no solution or infinite solution

(look at constants)

constants are same, so ∞

$\boxed{x = \infty}$

9) $\frac{2}{3}x + \frac{1}{4} = 2x - \frac{5}{12}$ (12)

LCM of 3, 4, and 12 is 12

$8x + 3 = 24x - 5$

$-8x \quad -8x$

$3 = 16x - 5$

$+5 \quad +5$

$\frac{8}{16} = \frac{16x}{16}$

$x = \frac{8}{16} \rightarrow \frac{1}{2}$

$\boxed{x = \frac{1}{2}}$

10) $2(3x-1) + 2(4x+5) = 8$

$6x - 2 + 8x + 10 = 8$

$6x + 8x - 2 + 10 = 8$

$14x + 8 = 8$

$-8 \quad -8$

$\frac{14x}{14} = \frac{0}{14}$

$\boxed{1x = 0}$

11) $17m + 50 = 356$

$-50 \quad -50$

$\frac{17m}{17} = \frac{306}{17}$

$\boxed{m = 18 \text{ months}}$

12) $3t + 21 = 60$

$-21 \quad -21$

$\frac{3t}{3} = \frac{39}{3}$

$\boxed{t = 13}$

13) $15(p-20) = 375$

$15p - 300 = 375$

$+300 \quad +300$

$\frac{15p}{15} = \frac{675}{15}$

$p = 45$

14) $10(p+2.2) = 53.9$

$10p + 22 = 53.9$

$-22 \quad -22$

$\frac{10p}{10} = \frac{31.9}{10}$

$\boxed{p = 3.19}$