Lesson 2-4 Solving Equations with the Variable on Each Side

Many equations contain variables on each side. To solve these equations, FIRST use addition or subtraction to write an equivalent equation with all of the variables on one side.

[Traditionally, the variables (letters) are "moved" to the left and the constants (numbers) are "moved" to the right side of the equal sign.]

A.
$$8+5s=7s-2$$

$$8+5s-7s=7s-1s-2$$

$$8+7s=7s-2$$

$$8+7s=7s-2$$

$$8+7s=7s-2$$

$$8+7s=7s-2$$

$$8+7s=7s-2$$

$$8+7s=7s-2$$

$$8+7s=7s-2$$

$$-8$$

$$-8$$

$$-3s=-10$$

$$-2$$

$$-2$$

$$-3$$

(Subtract '8' so constants are on the right.)

(Subtract '7s' so variables are on the left.)

(Simplify)

(Simplify)

(Multiply/divide)

(Simplify)

Check:

$$\frac{8+5(5)=7(5)-2}{8+25}=35-2$$
33 = 33

B. $3 - \frac{1}{4}r = \frac{1}{2}r + \frac{3}{4}$ $\frac{3}{3} - \frac{1}{4}r - \frac{1}{3}r = \frac{1}{3}r - \frac{1}{2}r + \frac{3}{4}$ $\frac{3}{3} - \frac{1}{4}r - \frac{3}{4}r = \frac{3}{4}r - \frac{3}{4}r = \frac{3}{4}r - \frac{3}{4}r = -\frac{1}{4}r - \frac{4}{3}r = -\frac{4}{3}r - \frac{4}{3}r - \frac{4}{3}r = -\frac{4}{3}r - \frac{4}{3}r - \frac{4}{3}r = -\frac{4}{3}r - \frac{4}{3}r - \frac{4}{$

Check: $3 - \frac{1}{4}(3) =$	$=\frac{1}{2}(3)+\frac{3}{4}$
3-34	3 4 3 4 7 7 7 7
9 4 =	9 4

Lesson 2-4 Solving Equations with the Variable on Each Side Try these on your own:

PRACTICE:

1. $9f - 6 = 3f + 7$	1.	9f –	6	=	3f	+	7
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2.
$$3-4q=10q+10$$

 2000			_

		3. 10

3.	3k - 5 = 7k - 21
-	

		77.5	
12	E - 10		

		 _

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Solving Equations with Grouping Symbols

C.
$$\frac{1}{3}(18 + 12q) = 6(2q - 7)$$

 $\frac{6 + 4q = 12q - 42}{6 + 4q - 12q} = 12q - 12q - 42$
 $\frac{6 - 8q}{80} = -42$
 $\frac{6 - 8q}{80} = -42$
 $\frac{-8q}{80} = -48$
 $\frac{-8q}{80} = -6$

$$Q = l_0$$
Check:

Check: 18+以·6)	= 6(2.6-7)
3(18+72)	6(12-7)
当(90)	6(5)
30	30
30	30

(Add/Subtract so variables are on the left.)

(Simplify)

(Add/subtract so constants are on the right.)

(Simplify)

(Multiply/divide)

(Simplify)

D.
$$6(3r-4) = \frac{3}{8}(40r+8)$$
 change problem
$$18r-24 = 15r+3$$

$$18r-15r-24 = 15r-15r+3$$

$$\frac{18r - 15r - 24 = 15r - 15r + 3}{3r - 24 = 3}$$

$$3r - 24 + 24 = 3 + 24$$

$$3r = 27$$

Check:
$$\frac{6(3.9-4)}{6(27-4)} = \frac{3}{8}(40.9+8)$$
$$\frac{6(27-4)}{6(23)} = \frac{3}{8}(360+8)$$
$$\frac{3}{8}(368)$$
$$138 = 138$$

50 Lesson 2-4 Solving Equations with the Variable on Each Side PRACTICE: Try these on your OWN

5.	3(a-5) = -6

6.	8 = 4(3c + 5)

7.	7. $4(2a-1) = -10(a-5)$					
-						

3.	2(w - 3)) + 5 =	3(w - 1)
			_

No Solution and Identities

An equation that is true for every value of the variable is called an identity When solving an equation, if no variables remain and the resulting equation is +rue, the equation is an identity. (The solution will be all real there are no variables remaining and the resulting equation is <u>false</u>, then there is no solution

J.

F.
$$8(5c-2) = 10(32+4c)$$

40c - 16 = 320+ 40c

$$-40c$$
 $-40c$ $-16 = 320$

False statement! NO SOLUTION

H.
$$\frac{1}{7}(21c - 56) = 3\left(c - \frac{8}{3}\right)$$

$$36-8=36-8$$

Infinitely many All Real Numbers Identity

G.
$$4(t+20) = \frac{1}{5}(20t+400)$$

$$44 + 80 = 44 + 80$$

True Statement!

Infinitely many solutions All Real Numbers (Identity)

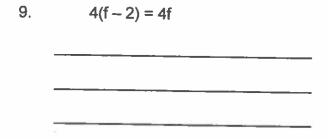
$$2(4a + 8) = 3(\frac{6a}{3} - 10)$$

no variables remain

No Solution

BY Lesson 2-4 Solving Equations with the Variable on Each Side Try these or your own PRACTICE:

10.



0 7		
-	65.	
12 No. 12		

5h - 7 = 5(h - 2) + 3

11.	3(1 + d) - 5 = 3d - 2				

