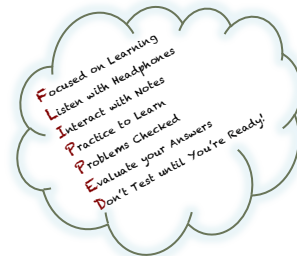


Write your questions here!

To solve equations with variables on both sides, collect the variables on one side, and the constants (regular numbers) on the other.

**CONCEPT SUMMARY***For Your Notebook***Steps for Solving Linear Equations**

- STEP 1** Use the distributive property to remove any grouping symbols.
- STEP 2** Simplify the expression on each side of the equation.
- STEP 3** Use properties of equality to collect the variable terms on one side of the equation and the constant terms on the other side of the equation.
- STEP 4** Use properties of equality to solve for the variable.
- STEP 5** Check your solution in the original equation.

Examples:

1.

2.

3.

4.

Weird Stuff that can happen....

When every number is a solution of the equation, the equation is called an **identity**. These can be found when both sides of the equation equal each other.

If no number exists that is a solution of the equation, we say that the equation has **no solution**. These can be found when all of the variables cancel (on both sides) and only two different numbers are left, set equal to each other.

Identity

$$2(2x - 4) + 16 = 4(x + 2)$$

No Solution

$$-15y + 7y + 1 = 3 - 8y$$

You try 2!:

$$10(1 + 4m) = 4(3 + 10m)$$

$$4(x - 3) = -2(6 - 2x)$$

So if you are solving and each side is equal to each other, write **identity**!
If they are not equal (and the variables have cancelled out), write **no solution**.

Practice 3.4

Solve each equation.

1) $-5 + 2m = -4m - 2m - 13$

2) $-9 + n = n - 1$

3) $x + 17 = -50 + x + 34 + 33$

4) $74 - 3n = n - 22$

5) $n - 1.2 = -1.8n + 3.84$

6) $a + 0.8 = -0.8a + 3.86$

7) $-10(-3v - 30) = 16v - 64$

8) $-111 + 51p = -35(12p + 57)$

$$9) 3(1 + x) = -3(x + 1)$$

$$10) 2(m + 2) = 2(2m + 2)$$

$$11) 3n - 3n = -4(2 - 5n) - 5(4n - 4)$$

$$12) 3(1 + 5v) - 4 = -4(-2v - 5)$$

$$13) -6(2n - 4) = -3(n + 4)$$

$$14) -6(3x - 7) = -2 - 4(4x - 7)$$

$$15) -2(a - 3) = -(4 + 2a)$$

$$16) 4n - 4(1 - n) = -4 + 8n$$

Application And Extension

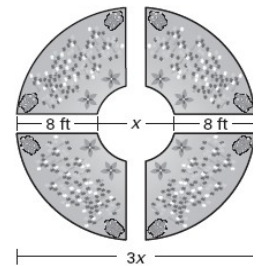
Solve the following equations for the unknown variable:

1. $2x - 14 = -3x + 6$

2. $10z - 4 = 2(5z - 2)$

3. Find the length of a rectangle where the length is 5 units more than the width and the perimeter is 9 times the width. *(Draw a picture!)*

4. **Dimensions of a Circular Flower Garden** A flower garden has the shape shown. The diameter of the outer circle is three times the diameter of the inner circle. The lengths of the walkways are 8 feet long. What is the diameter of the inner circle?



Quick Review	1. Multiply: $\frac{7}{8} \cdot \frac{4}{21}$	2. Evaluate if $z = -1$ and $y = -9$ $-y - z$	3. Simplify: $\frac{4 - 7}{12} \cdot 16$
	1. Distribute: $-(-4w + 1)$	2. Simplify: $-x - (y - 3x)$	3. Solve for x : $\frac{x}{100} = \frac{4}{5}$

Practice 3.4 Answers

10) $2(m+2) = 2(2m+2)$
 $2m+4 = 4m+4$
 $-2m = -2m$
 $4 = 2m+4$
 $-4 = -4$
 $0 = 2m$
 $0 \neq 2m$
NO SOLUTION

11) $3(1+x) = -3(x+1)$
 $3+3x = -3x-3$
 $+3x = -3x-3$
 $3+6x = -3$
 $6x = -6$
 $x = -1$

12) $3(1+5v) - 4 = -4(-2v-5)$
 $3+15v-4 = 8v+20$
 $15v-1 = 8v+20$
 $-8v = 21$
 $7v-1 = 20$
 $7v = 21$
 $v = 3$

13) $-6(2n-4) = -3(n+4)$
 $-12n+24 = -3n-12$
 $+12n = -3n-12$
 $24 = 9n-12$
 $+12 = 9n$
 $36 = 9n$
 $n = 4$

14) $-6(3x-7) = -2-4(4x-7)$
 $-18x+42 = -2-16x+28$
 $-18x+42 = -16x+26$
 $+18x = -16x+26$
 $42 = 2x+26$
 $16 = 2x$
 $8 = x$

15) $-2(a-3) = (4+2a)$
 $-2a+6 = 4+2a$
 $-2a+6 = 4+2a$
 $6 = 4$
NO SOLUTION

16) $4n-4(1-n) = -4+8n$
 $4n-4+4n = -4+8n$
 $8n-4 = -4+8n$
 $-8n = -4+8n$
 $-4 = 4$
Infinitely many solutions

9) $3(1+x) = -3(x+1)$
 $3+3x = -3x-3$
 $+3x = -3x-3$
 $3+6x = -3$
 $6x = -6$
 $x = -1$

11) $3n-2n = -4(2-5n) - 5(4n-4)$
 $0 = -8+20n-20n+20$
 $0 = 12$
NO SOLUTION

13) $-6(2n-4) = -3(n+4)$
 $-12n+24 = -3n-12$
 $+12n = -3n-12$
 $24 = 9n-12$
 $+12 = 9n$
 $36 = 9n$
 $n = 4$

15) $-2(a-3) = (4+2a)$
 $-2a+6 = 4+2a$
 $-2a+6 = 4+2a$
 $6 = 4$
NO SOLUTION

2) $-9+n = 1-1$
 $-9+n = 0$
 $n = 9$
NO SOLUTION

4) $74-7n = n-22$
 $+7n = n-22$
 $74 = 8n-22$
 $+22 = 8n-22$
 $96 = 8n$
 $n = 12$

6) $a+0.8 = -0.8a+3.86$
 $+0.8a = -0.8a+3.86$
 $1.8a = 3.86$
 $a = 2.14$

8) $-111+51p = -35(12p+57)$
 $-111+51p = -420p-1995$
 $+420p = -420p-1995$
 $-111+471p = -1995$
 $471p = -1884$
 $p = -4$

1) $-5+2m = -4m-2m-13$
 $-5+2m = -6m-13$
 $+6m = -6m-13$
 $8m = -13$
 $m = -1.625$
NO SOLUTION

3) $x+17 = -50+x+34+33$
 $x+17 = x+17$
Infinitely many solutions

5) $n-1.2 = -1.8n+3.84$
 $+1.8n = -1.8n+3.84$
 $2.8n = 3.84$
 $n = 1.37$

7) $-10(-3v-30) = 16v-64$
 $30v+300 = 16v-64$
 $-16v = 16v-64$
 $14v = -64$
 $v = -4.57$
NO SOLUTION