

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**.

Now, summarize  
your notes here!

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Solve each equation.

## Practice 3.4

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*

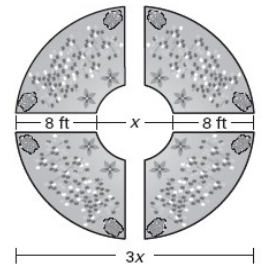
Solve the following equations for the unknown variable:

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?



*3.4 Review Skills*

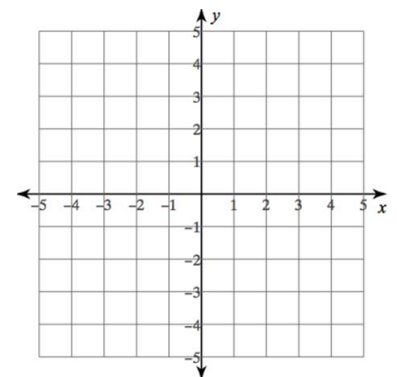
1. Simplify:

$$\frac{(-2) - (-4)}{-2 - (-3)} =$$

2. Simplify:

$$\frac{-3(4)^2 - (-2)}{3} =$$

3. Plot (3, -2) and (4, -3)



4.

$$\frac{-100 - (-25)}{-20 - (-45)} =$$

5.

$$\frac{-3(-3)^2 - (10)}{-30 - 7} =$$