Chapter 4: Algebraic Equations

A letter is just a variable!

A variable is something that can change.

A constant is something that stays the same.

Algebraic Expression	**Translation**
$3\,x$	3 times a number (variable)
$5p - 3$	5 times a number (variable) minus 3 **OR** 3 less than 5 times a number (variable) **OR** 3 subtracted from 5 times a number (variable)
$\frac{m}{7}$	A number (m) divided by 7 The quotient of m and 7

***Math Tip:** Remember to use **BEDMAS** (**B**rackets **E**xponents **D**ivision/**M**ultiplication and then **A**ddition/**S**ubtraction)

Problems: Evaluate

Evaluate: 2 x + 5, where x = 3

**Evaluate means "plug-it-in" OR find what the answer is.*

2 x + 5 (where =3)
= 2(3) + 5
= 6 + 5
= 11

If a problem asks you to "evaluate this expression", expression means a combination of variables and constants in algebraic form.

You can evaluate one single expression infinite number of times by using different variables!

Problems: Solving for the Variable

When bringing a number from one side of an equation to another, you need to remember the opposite operations occur.

Example:

$x + 3 = 8$

When bringing 8 to the other side of the equation (before the equals sign), you need to change the operation (right now it is denoting a + 8, it will change to a – 8 when brought over)

$x + 3 – 8 = 0$

- When you multiply on one side of an equation, you would divide to bring it to the other side.
- When you divide on one side of an equation, you would multiply to bring it to the other side.

*Math Tip: Whatever you do to one side of an equation, you have to do to the other.

Solve for the variable: $x + 7 = 10$

$x + 7 = 10$
$x + 7 – 7 = 10 – 7$
$x = 3$

Solve for the variable: $x + 2 = 12$

$x + 2 = 12$
$x + 2 – 2 = 12 – 2$
$x = 10$

Solve for the variable: $x - 5 = 13$

$x - 5 = 13$
$x - 5 + 5 = 13 + 5$
$x = 18$

Solve for the variable: $5x = 35$

$5x = 35$
$\frac{5x}{5} = \frac{35}{5}$
$x = 7$

Solve for the variable: $3x = 27$

$3x = 27$
$\frac{3x}{3} = \frac{27}{3}$
$x = 9$

Solve for the variable: $\frac{x}{3} = 13$

$\frac{x}{3} = 13$
$3 \cdot \frac{x}{3} = 13 \cdot 3$
$x = 39$

*Math Tip: Always look for "how do I get x by itself." That's what's important. The other numbers are there for the ride.

Further Practice

1. **Solve for the variable: $x + 23 = 33$**

   x = _____

2. **Solve for the variable: $x + 9 = 3$**

   x = _____

*Math Tip: Your answer may be a negative number (as shown above); it will not always be a positive number.

3. **Solve for the variable: $x - 11 = 2$**

x = _____

4. **Solve for the variable: $x - 3 = 44$**

x = _____

5. **Solve for the variable: $3x = 33$**

x = _____

6. **Solve for the variable: $7x = 49$**

x = _____

7. **Solve for the variable: $\frac{4p}{6} = 2$**

p = _____

8. **Evaluate $x = 5a + 3$, where $a = 3$**

x = _____

9. **Evaluate $x = 4b + 5$, where $b = 8$**

x = _____