Pick up a Solving 1 variable equations Worksheet from the front table and do

#1, 6, and 10

Go over Solving for 1 variable worksheet

1) $3 = x - 2$

$+2 \quad +2$

$5 = x$

6) $8 - 4a + 4 = 16$

$12 - 4a = 16$

$-12 \quad -12$

$-4a = 4$

$\frac{-4a}{-4} = \frac{4}{-4}$

$a = -1$

10) $-1 = -x - 1 + 6x$

$-1 = 5x - 1$

$+1 \quad +1$

$\frac{0}{5} = \frac{5x}{5}$

$0 = x$

$-1 = -(0) - 1 + 6(0)$

$-1 = -1$ ✓

Introduction

Thoughts or feelings in language are often conveyed through expressions; however, mathematical ideas are conveyed through **algebraic expressions**.

Algebraic expressions are **mathematical statements** that include numbers, operations, and variables to represent a number or quantity.

Variables are letters used to represent values or unknown quantities that can change or vary. One example of an algebraic expression is $3x - 4$. Notice the variable, x.

Key Concepts

- Expressions are made up of **terms**. A term is a **number**, a **variable**, or the product of a number and variable(s). An **addition** or **subtraction** sign separates each term of an expression.
- In the expression $4x^2 + 3x + 7$, there are 3 terms: $4x^2$, $3x$, and 7.
- The **factors** of each term are the numbers or expressions that when multiplied produce a given product. In the example above, the factors of $4x^2$ are **4** and $\boldsymbol{x^2}$. The factors of $3x$ are 3 and x.

Key Concepts, *continued*

- 4 is also known as the **coefficient** of the term $4x^2$. A coefficient is the number multiplied by a variable in an algebraic expression. The coefficient of $3x$ is 3.
- The term $4x^2$ also has an **exponent**. Exponents indicate the number of times a factor is being **multiplied** by itself. In this term, 2 is the exponent and indicates that x is multiplied by itself 2 times. $X \cdot X$
- Terms that do not contain a variable are called **constants** because the quantity does not change. In this example, **7** is a constant.

Key Concepts, *continued*

Expression	$4x^2 + 3x + 7$		
Terms	$4x^2$	$3x$	7
Factors	$4 \cdot x^2$	$3 \cdot x$	
Coefficients	4	3	
Constants			7

Key Concepts, *continued*

- Terms with the same variable raised to the same exponent are called **like terms**. In the example $5x + 3x - 9$, $5x$ and $3x$ are like terms. Like terms can be combined following the **order of operations** by evaluating grouping symbols, evaluating exponents, completing multiplication and division, and completing addition and subtraction from left to right. In this example, the sum of $5x$ and $3x$ is $8x$.

Common Errors/Misconceptions

- incorrectly following the order of operations
- incorrectly identifying like terms
- incorrectly combining terms involving subtraction

Example 2

multiply X addition equals

2 times a number plus 5 is 27.

1. Translate the verbal expression into an algebraic expression.

$2 \cdot x + 5 = 27 \rightarrow 2x + 5 = 27$

2. Identify all terms

3 terms → $2x, 5, \& 27$

3. Identify the factors.

$2x \rightarrow 2 \& x$

4. Identify all coefficients.

2

5. Identify any constants.

$5 \& 27$

Example 2

2 times a number plus 5.

Expression	$2x + 5$	
Terms	$2x$	5
Factors	$2 \cdot x$	———
Coefficients	2	———
Constants	———	5

1) $4+n=17$

2) $5x=20$

3) $3x-5$

$x \cdot 3-5$

$x3-5$

4) $5+3x=11$

$5+x \cdot 3=11$

$5+x3=11$

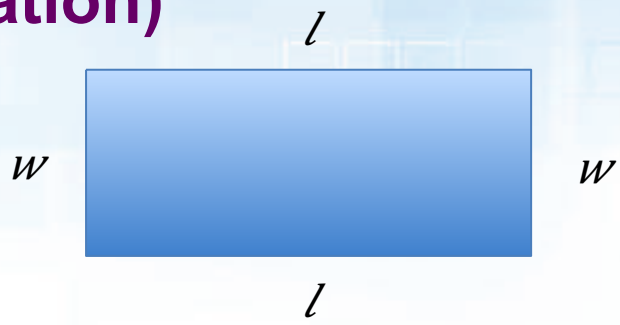
Guided Practice

Example 3

A rectangle has a perimeter of 110 inches. The width of the rectangle is 9 inches less than the length, What is the width, in inches, of the rectangle?

Guided Practice: Example 3, *continued*

1. **Translate the verbal expression into an algebraic expression. (Hint: use a drawn representation)**



Let l represent the unknown length. We know that the width is 9 less than the length ($w = l - 9$). So the equation for the perimeter is

$$l + l + (l - 9) + (l - 9) = 110$$

Guided Practice: Example 3, *continued*

2. Simplify the expression and solve.

The expression can be simplified by following the order of operations and combining like terms.

Guided Practice: Example 3, *continued*

3. Check that you have answered the question.

*A rectangle has a perimeter of 110 inches. The width of the rectangle is 9 inches less than the length, What is the **width**, in inches, of the rectangle?*

We have solved for the length, how do we solve for width?

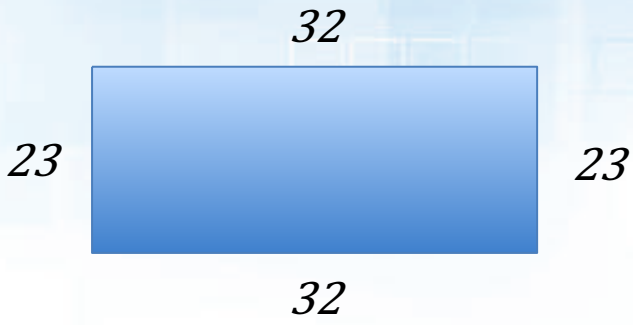
Plug the length into the width equation! $w = l - 9$ w

$$= 32 - 9 = 23$$

$$w = 23$$

Guided Practice: Example 3, *continued*

4. Check your answer.



Does the perimeter equal 110 inches?