

LESSON 1 | MEET THE IDEA

Expressions, substitution and equivalent forms

Tuesday, October 13, 2026 . 6:00–7:00 PM Central

By the end, I can...
Replace a variable with a value, follow the order of operations, and write a simpler expression with the same value.

An **expression** is a mathematical phrase, such as $3x + 7$. It has no equals sign. A letter stands for a number; its value can change.

Word	What it means
Variable	A letter representing a number, such as x .
Coefficient	The number multiplying a variable: 3 in $3x$.
Term	A part separated by addition or subtraction; keep its sign.
Constant	A number with no variable attached: 7 here.

$3x$

variable term

$+$

7

constant term

3 is the coefficient: $3x$ means $3 \times x$.

Quick refresher: $3 \times (-2) = -6$. Adding 7 then gives 1. Parentheses help keep a negative value together.

LESSON 1 | WORKED EXAMPLES

Substitute, then calculate

To **evaluate** an expression, replace every copy of the variable with its given value. Put negative values in parentheses.

Example 1 | Evaluate $3x + 7$ when $x = -2$

$$3(-2) + 7$$

Replace x with (-2) .

$$-6 + 7$$

Multiply before adding.

$$1$$

Now add. The value of the expression is 1.

Example 2 | Evaluate $2a^2 - 3b$ when $a = -3$ and $b = 4$

$$2(-3)^2 - 3(4)$$

Replace both variables.

$$2(9) - 12$$

Square (-3) and multiply 3 by 4.

$$18 - 12 = 6$$

Complete the multiplication, then subtract.

The exponent acts on (-3) because the negative value is inside parentheses.

Use this order

Grouping symbols first; then exponents; then multiplication and division from left to right; finally addition and subtraction from left to right.

Watch the difference: $(-3)^2 = 9$, but $-3^2 = -(3^2) = -9$. The position of the parentheses matters.

LESSON 1 | DISTRIBUTE AND SIMPLIFY

Make an equivalent expression

Equivalent expressions have the same value for every allowed value of the variable. Distributing multiplies **each** term inside the parentheses.



$$3(x + 4) = 3x + 12$$

The rectangle models positive lengths. The rule $3(x + 4) = 3x + 12$ also works when x is zero or negative.

Example 3 | Simplify $-2(3x - 4) + 5x$

$$-6x + 8 + 5x$$

Multiply both $3x$ and -4 by -2 .

$$(-6 + 5)x + 8$$

Combine the x -terms.

$$-x + 8$$

The coefficient -1 is usually written as just a minus sign.

Combine only like terms

$3x + 2x = 5x$, but $3x + 2$ cannot become $5x$. A variable term and a constant describe different things.

In real life: a club charges \$8 to join and \$3 per visit. For n visits, the cost is $8 + 3n$ dollars. At $n = 4$, the cost is $8 + 12 = \text{\$20}$.

LESSON 1 | SHORT CHECKS

Your turn

Try these before reading the next page. Show a useful line of working. These are quick understanding checks; your main homework is in digital practice.

1. Evaluate $4x - 3$ when $x = -2$.

2. Simplify $2(x + 5) + 3x$.

3. Simplify $-3(2a - 4) + a$.

4. A craft club charges \$6 to join and \$2 per session. Write the cost for n sessions, then find the cost of 5 sessions.

5. A student says $3x + 2 = 5x$ for every x . Use $x = 2$ to show whether the claim is correct.

Before you move on

Have you used parentheses for negative substitutions? Have you multiplied every term in a bracket? Have you combined only like terms?

LESSON 1 | WORKED ANSWERS AND RECAP

Check your thinking

1. $4(-2) - 3 = -8 - 3 = -11$. Multiply first; then subtract 3.
2. $2(x + 5) + 3x = 2x + 10 + 3x = 5x + 10$. The 2 multiplies both x and 5.
3. $-3(2a - 4) + a = -6a + 12 + a = -5a + 12$. A negative times a negative gives a positive.
4. Cost = $6 + 2n$ dollars. At $n = 5$: $6 + 2(5) = \$16$. The \$6 fee is paid once.
5. At $x = 2$, $3x + 2 = 8$ but $5x = 10$. Since the values differ, the expressions are **not equivalent**. One counterexample disproves “for every x .”

The three moves to remember

Substitute: replace the letter carefully.

Distribute: multiply every term inside the bracket.

Combine: collect terms with the same variable part.

I can...

- ☐ Evaluate an expression with a negative input.
- ☐ Explain why two expressions are equivalent.
- ☐ Check a simplification by trying a value.

Next class: use equivalent steps to solve equations. Curriculum focus: TEKS A.10D. These are original Cambridge Veritas learning notes.