

Incoming Algebra I Summer Packet 2026

Welcome to Algebra I! To keep you prepared for Algebra I in August, you must complete this packet in its entirety. It will be turned in for your first grade the first Friday of school. Prior to each review section, you will see a few example problems as well as a link to a video for additional help. A quiz on this material will be taken the first FULL week of school. Make sure to show all work and you may use a calculator, but steps MUST still be shown. Please reach out via email if I can help in any way. I check email frequently and I am happy to help if you're struggling with any of this work.

Sincerely,

Mrs. McAllister

Amcallister1@lsu.edu

TOPIC #1 EXPONENT RULES (6 PROBLEMS)

Math 8 Standard Addressed: 8.EE.A.1

Product of Exponents: <https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-numbers-operations/cc-8th-exponent-properties/v/exponent-properties-involving-products>

Power of Powers: <https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-numbers-operations/cc-8th-exponent-properties/v/products-and-exponents-raised-to-an-exponent-propertiesn>

Division of Exponents: <https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-numbers-operations/cc-8th-exponent-properties/v/exponent-properties-involving-quotients>

Exponent Rules

Zero Exponent: Any base raised to the zero power equals 1.

$$\text{Ex: } (-9)^0 = 1$$

Negative Exponent: Move the base to the opposite side of the fraction bar and make the exponent positive.

$$\text{Ex: } 3^{-4} = \frac{1}{3^4} = \frac{1}{81}$$

Monomial x Monomial: Multiply the coefficients and add the exponents of like bases.

$$\text{Ex: } (-2x^3)(8x^{-5}) = -16x^{-2} = \frac{-16}{x^2}$$

Monomial ÷ Monomial: Divide the coefficients and subtract the exponents of like bases.

$$\text{Ex: } \frac{4ab^3}{4a^2b^2} = 1a^{-1}b^1 = \frac{b}{a}$$

Power of a Monomial: Raise each base (including the coefficient) to that power. If a base already has an exponent, multiply the two exponents.

$$\text{Ex: } (3x^3y^2)^3 = 3^3x^9y^6 = 27x^9y^6$$

Power of a Quotient: Raise each base (including the coefficients) to that power. If a base already has an exponent, multiply the two exponents.

$$\text{Ex: } \left(\frac{5a^3b}{2c^{-1}}\right)^2 = \frac{5^2a^6b^2}{2^2c^{-2}} = \frac{25a^6b^2c^2}{4}$$

1. $x^6 \cdot x^4$

2. $(5^3)^2$

3. $-6a^2b^{-4}c \cdot 4ab^2$

4. $\frac{a^3b^{-6}}{c^{-2}}$	5. $\frac{24d^5f^{-5}g^8}{36d^{-3}f^9g^2}$	6. $(8w^3x^2)^0$
-------------------------------	--	------------------

TOPIC #2 ALGEBRAIC EXPRESSIONS (12 PROBLEMS)

Math 7 & 8 Standard Addressed: 7.EE.A.1 and 8.EE.C.7b

(Remember, algebraic expressions do not have an equal sign so we can only simplify them if variables are involved or evaluate them if not variables are included and NOT solve them for a variable!)

Evaluating Algebraic Expressions

<ol style="list-style-type: none"> Substitute the given values for the variables in the expression Evaluate the expression using the order of operations <ul style="list-style-type: none"> • Parentheses/Brackets (inside to outside) • Exponents • Multiplication/Division (left to right) • Addition/Subtraction (left to right) 	<p>ex: $9x^2 - 4(y + 3z)$ for $x = -3, y = 2, z = 5$</p> $9(-3)^2 - 4(2 + 3 \cdot 5)$ $9(-3)^2 - 4(2 + 15)$ $9(-3)^2 - 4 \cdot 17$ $9 \cdot 9 - 4 \cdot 17$ $81 - 4 \cdot 17$ $81 - 68 = \boxed{13}$
--	--

The Distributive Property

<ol style="list-style-type: none"> Multiply the number outside the parentheses by each term in the parentheses. Keep the addition/subtraction sign between each term. 	<p>ex: $5(8x - 3)$</p> $5(8x - 3)$ $5(8x) - 5(3)$ $\boxed{40x - 15}$
---	---

Simplifying Algebraic Expressions

<ol style="list-style-type: none"> Clear any parentheses using the Distributive Property Add or subtract like terms (use the sign in front of each term to determine whether to add or subtract) 	<p>ex: $2(3x - 4) - 12x + 9$</p> $2(3x - 4) - 12x + 9$ $6x - 8 - 12x + 9$ $\boxed{-6x + 1}$
--	--

Helpful links:

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:foundation-algebra/x2f8bb11595b61c86:intro-variables/v/variables-and-expressions-1>

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:foundation-algebra/x2f8bb11595b61c86:substitute-evaluate-expression/v/evaluating-expressions-in-two-variables-with-decimals-and-fractions>

Evaluate each expression using the following values. Show all necessary work.

$$a = 9, b = -3, c = -2, d = 7$$

1. $a - cd$	2. $2b^3 + c^2$	3. $\frac{a+d-c}{b}$
4. $(a - b)^2 + d(a + c)$	5. $4c - (b - a)$	6. $2bc + d(12 - 5)$

Simplify each expression using the distributive property and combining like terms.

7. $8(x + 1) - 12x$	8. $9n - 8 + 3(2n - 11)$	9. $3(7x + 4y) - 2(2x + y)$
10. $(15 + 8d)(-5) - 24d + d$	11. $9(b - 1) - c + 3b + c$	12. $8(h - 4) - h - (h + 7)$

TOPIC #3 SOLVING ONE VARIABLE EQUATIONS (6 PROBLEMS)

Math 8 Standard Addressed: 8.EE.C.7

Helpful Videos: <https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:solve-equations-inequalities/x2f8bb11595b61c86:linear-equations-variables-both-sides/v/solving-equations-2>

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:solve-equations-inequalities/x2f8bb11595b61c86:linear-equations-parentheses/v/solving-equations-with-the-distributive-property>

Solving Multi-Step Equations

1. Clear any parentheses using the Distributive Property
2. Combine like terms on each side of the equal sign
3. Get the variable terms on the same side of the equation by adding/subtracting a variable term to/from both sides of the equation to cancel it out on one side
4. The equation is now a two-step equation, so finish solving it as described above

ex: $5(2x - 1) = 3x + 4x - 1$

$$10x - 5 = 3x + 4x - 1$$

$$10x - 5 = 7x - 1$$
$$\begin{array}{r} -7x \quad -7x \\ \hline 3x - 5 = -1 \end{array}$$

$$3x - 5 = -1$$
$$\begin{array}{r} +5 \quad +5 \\ \hline 3x = 4 \end{array}$$

$$\frac{3x}{3} = \frac{4}{3}$$

$$x = \frac{4}{3}$$

1. $5x - 3 = -28$

2. $\frac{w+8}{-3} = -9$

3. $-8 + \frac{h}{4} = 13$

4. $8x - 4 = 3x + 1$

5. $-2(5d - 8) = 20$

6. $-9g - 3 = -3(3g + 2)$

TOPIC #4 LINEAR EQUATIONS AND SLOPE (6 PROBLEMS)

Math 8 Standard addressed: 8.EE.B.5, 8.EE.B.6

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:linear-equations-graphs/x2f8bb11595b61c86:two-variable-linear-equations-intro/v/2-variable-linear-equations-graphs>

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:linear-equations-graphs/x2f8bb11595b61c86:slope/v/introduction-to-slope>

Finding Slope from 2 Points

Slope Formula: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Ex: Find the slope of the line that passes through the points $(-9, -3)$ and $(7, -7)$

Special Cases:

$\frac{0}{\#} \rightarrow$ slope = 0 $\frac{\#}{0} \rightarrow$ slope is undefined

$$m = \frac{-7 - (-3)}{7 - (-9)} = \frac{-4}{16} = \boxed{-\frac{1}{4}}$$

Slope-Intercept Form

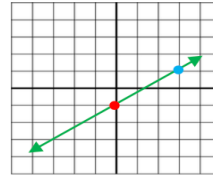
$$y = mx + b$$

$m = \text{slope}$ & $b = \text{y-intercept}$

Ex: Graph $y = \frac{2}{3}x - 1$

Graphing from Slope-Intercept Form:

1. Make a point at the y-intercept.
2. Use the slope $\left(\frac{\text{rise}}{\text{run}}\right)$ to make more points.
3. Connect the points to form a line.



y-intercept is -1
slope = $\frac{2}{3}$, (so from the y-intercept go up 2 & right 3)

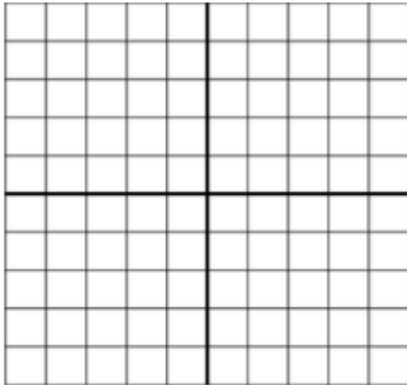
Find the slope of the line that passes through the pair of points.

1. $(9, -3)$ and $(9, 8)$

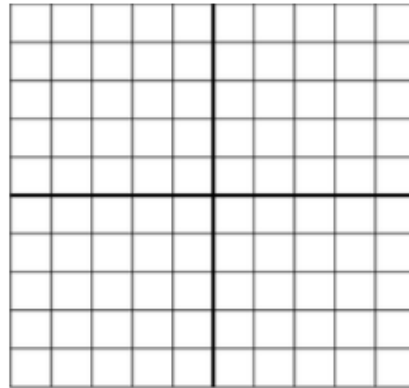
2. $(-8, 5)$ and $(3, -6)$

Graph each line.

$$3. y = -\frac{3}{2}x + 2$$



$$4. y = x - 3$$



USE FUNCTIONS TO MODEL RELATIONSHIPS BETWEEN QUANTITIES.

Math 8 Standard Addressed: 8.F.B.4

1. Create a model from a verbal description.

A local gym charges a one-time registration fee of **\$50** and a monthly membership fee of **\$35**.

- **A.** Write a linear function in slope intercept form, $y = mx + b$ to represent the total cost, y , for x months of membership.
- **B.** Identify the rate of change and the initial value in this context.

2. Create a model from a table of data.

The table below shows the height of a candle h in centimeters after it has been burning for t hours.

Time (t hours)	Height (h cm)
2	18
5	13.5
8	9

- A.** Determine the rate of change (how fast the candle burns per hour).
- B.** Determine the initial height of the candle before it was lit.
- C.** Write the equation that models this relationship.