Algebraic Properties

Commutative

$a + b = b + a$

$a \cdot b = b \cdot a$

Associative

$a + (b + c) = (a + b) + c$

$a \cdot (b \cdot c) = (a \cdot b) \cdot c$

Identity

$a + 0 = a$

$a \cdot 1 = a$

Inverse

$a + (-a) = 0$

$\frac{a}{b} \cdot \frac{b}{a} = 1; b \neq 0$

Zero-Product

$a \cdot 0 = 0$

If $ab = 0$, then a or b equals zero

Distributive

$a(b + c) = ab + ac$

$a(b - c) = ab - ac$

Linear Equations

Slope Formula

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

Point-Slope Form

$y - y_1 = m(x - x_1)$

Slope-Intercept Form

$y = mx + b$

Standard Form

$Ax + By = C$

Horizontal Lines $y = b$

Vertical Lines $x = a$

Quadratic Functions

Standard Form

$y = ax^2 + bx + c$

Vertex Form

$y = a(x - h)^2 + k$

Properties of Equality

For all real numbers a, b, and c

Addition Property of Equality

If $a = b$, then $a + c = b + c$

Multiplication Property of Equality

If $a = b$, then $ac = bc$

Symmetry

If $a = b$, then $b = a$

Reflexive

$a = a$

Substitution

If $a = b$, then b can replace a in expressions and equations.

Exponential Functions

$y = ab^x + k$

$y = a(1 \pm r)^t$

Figures and Formulas:

Perimeter (P), Area (A), Volume (V), and Surface Area (SA)

Rectangle

$A = lw$ or $A = bh$

$P = 2l + 2w$ **or** $P = 2(l + w)$

Triangle

$A = \frac{1}{2}bh$ **or** $A = \frac{bh}{2}$

Rectangular Prism

$V = lwh$

$SA = 2lw + 2wh + 2lh$

Other Formulas

$|x| = \sqrt{(x)^2}$

$x^{\frac{1}{a}} = \sqrt[a]{x}$

$a_n = a_1 + d(n - 1)$

Exponent Rules

Where a, b, and c are rational numbers and $a \neq 0$

1. $a^b a^c = a^{b+c}$
2. $(a^b)^c = a^{b \cdot c}$
3. $(ab)^c = a^c b^c$
4. $a^b = \frac{1}{a^{-b}}$ or $a^{-b} = \frac{1}{a^b}$
5. $a^0 = 1$
6. $\left(\frac{a}{b}\right)^c = \frac{a^c}{b^c}$
7. $\frac{a^b}{a^c} = a^{b-c}$ or $\frac{1}{a^{c-b}}$
8. $a^{\frac{n}{d}} = \sqrt[d]{a^n}$

Common Conversions

1 hour (hr) = 60 minutes (min)

1 minute (min) = 60 seconds (sec)

1 day = 24 hours (hr)

1 year (yr) = 365 days

1 foot (ft) = 12 inches (in)

1 yard (yd) = 3 feet (ft)

1 mile (mi) = 5,280 feet (ft)

1 pound (lb) = 16 ounces (oz)

1 Tablespoon (Tbsp) = 3 teaspoons (tsp)

3 teaspoons (tsp) = 15 milliliters (mL)

1 Tablespoon (Tbsp) = 15 milliliters (mL)

1 gallon (gal) = 4 quarts (qt)

1 quart (qt) = 2 pint (pt)

1 pint (pt) = 2 cups (c)

1 ton = 2,000 pounds (lb)

1 Liter (L) = 1,000 milliliters (mL)

1 meter (m) = 100 centimeters (cm)

1 inch (in) = 2.54 centimeters (cm)

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⊕ Exceeding

I understand all of the objectives (or lesson).

I can show **and** explain my work for the practice questions and mastery check.

I can find and correct my errors.

I am confident that I can teach this to others.

✓ Progressing

I understand most of the objectives (or lesson).

I can show and explain my work most of the time for the practice questions and mastery check.

I can correct my errors when they are pointed out.

I can do most of the work independently.

⊖ Needs Practice

I am confused or struggling with the objectives.

I do not understand the lesson.

I need to ask many questions to better understand the lesson.

I need help completing most of the practice and/or mastery check.

I need to watch the videos again before I can try the practice questions.

Skill	Criteria	⊕ ✓ ⊖
Say what you know	I can explain the lesson and lesson objectives in my own words.	
Show what you know		
Perseverance	**I can solve the problem without giving up.** I used previous learning to solve the problem. I thought about the problem in multiple ways. I could show that there is more than one way to solve a problem. **or** I could explain why different approaches to solving a problem resulted in the same solution.	
Accuracy	**I work carefully and check that solutions are reasonable.** I checked that my answers are accurate. I looked for more efficient and precise methods to solve. I decided if my solution made sense for the problem.	
Reasoning	**I can explain my thinking.** I looked for patterns and rules. I looked for multiple ways to solve or represent solutions when needed. I chose the correct math tools. *(e.g., Formula Sheet, calculator, graphing calculator, Digital Pack, etc.)* I generalized thinking and applied it to multiple problem types.	

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