I CAN Checklist – Chapter 1

I CAN… identify variables, coefficients, constants and operations. ❑

I CAN… write expressions using exponents. ❑

I CAN… evaluate expressions. ❑

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☐ I CAN… use the Distributive Property to simplify expressions. ❑

☐ I CAN… simplify expression by combining like terms.
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☐ I CAN… identify variables, coefficients, constants and operations.  

Variables are the letters used in our expressions.  
Coefficients are the numbers “attached” to the variables in our expressions.  
Constants are the numbers that are not “attached” to the variables in our expressions.  
Operations are the symbols that tell us what to do with the variables and numbers in our expressions.  

Examples:  
Identify the variables, coefficients, constants and operations in the expressions.

a) \(5p + 4\)  
   variable: \(p\)  
   coefficient: 5  
   constant: 4  
   operations: +, x  
   (5p is 5 times p)

b) \(6a^2 + a + 4b - 3\)  
   variables: \(a, b\)  
   coefficients: 6, 4  
   constants: 3  
   operations: +, −, x, \(^2\)  
   (exponents are operations too)

Practice:  
Identify the variables, coefficients, constants and operations in the expressions.

1) \(12 + 10c\)  
2) \(15 + 3w + 1.5\)  
3) \(z^2 + 9z\)

☐ I CAN… write expressions using exponents.  

Exponents represent the number of times a factor is multiplied to itself.  

Examples:  
Write each expression using exponents.

a) \(d \cdot d \cdot d \cdot d = d^4\)  
   \(d\) is used as a factor 4 times, so its exponent is 4

b) \(5 \cdot m \cdot m \cdot m = 5m^3\)  
   \(m\) is used as a factor 3 times, so its exponent is 3

Practice:  
Write each expression using exponents.

1) \(2 \cdot c \cdot c \cdot c \cdot c \cdot c \cdot c\)  
2) \(15x \cdot x \cdot y \cdot y \cdot y\)
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☐ I CAN… evaluate expressions.

To evaluate expressions, you must substitute values in for variables and perform the remaining operations.

Examples:
Evaluate the expressions when \(a = 8\) and \(b = 2\).

\[\begin{align*}
\text{a)} & \quad a + 6 & \text{b)} & \quad ab & \text{c)} & \quad b^2 - 4 \\
& \quad 8 + 6 & & \quad 8 \cdot 2 & & \quad 2^2 - 4 \\
& \quad 14 & & \quad 16 & & \quad 4 - 4 \\
\end{align*}\]

Practice:
Evaluate the expressions when \(p = 24\) and \(q = 8\).

1) \(p \div q\)  
2) \(p - q\)  
3) \(pq\)  
4) \(q^2 + 6\)

☐ I CAN… translate phrases into expressions.

We can use words to describe expressions. By using phrases, we can determine which operation to use and how to order our numbers and variables.

Examples:
Write the phrase as an expression.

\[\begin{align*}
\text{a)} & \quad \text{the product of 3 and a number } n & \quad 3 \cdot n \quad \text{or} \quad 3n \\
\text{b)} & \quad \text{25 less than a number } b & \quad b - 25 \quad \text{(NOT} \ 25 - b) \\
\text{c)} & \quad \text{the quotient of 3 and a number } z & \quad 3 \div z \quad \text{or} \quad \frac{3}{z} \\
\end{align*}\]

Practice:
Write the phrase as an expression.

1) the sum of 2 and 3  
2) 8 fewer than 21  
3) Twice a number
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☐ I CAN… describe, identify and use the Commutative Properties.

Commutative Properties allow you to “flip” or change the order of the numbers and variables in your expression.

Commutative Property of Addition: \[ a + b = b + a \]
Commutative Property of Multiplication: \[ a \cdot b = b \cdot a \]

Examples:
Simplify the expression. Explain each step.

a) \[ 3 + x + 12 \]
   \[ 3 + 12 + x \quad \text{Comm. Prop. Of Comm. Prop.} \]
   \[ 15 + x \quad \text{Add 3 and 12} \]

b) \[ 4 \cdot s \cdot 5 \]
   \[ 4 \cdot 5 \cdot s \quad \text{Comm. Prop. of x} \]
   \[ 20 \cdot s \quad \text{Multiply 4 and 5} \]

☐ I CAN… describe, identify and use the Associative Properties.

Associative Properties allow you to change the groupings of the numbers and variables in your expression.

Associative Property of Addition: \[ (a + b) + c = a + (b + c) \]
Associative Property of Multiplication: \[ (a \cdot b) \cdot c = a \cdot (b \cdot c) \]

Examples:
Simplify the expression. Explain each step.

a) \[ 4 + (1 + y) \]
   \[ (4 + 1) + y \quad \text{Assoc. Prop. Of Add 4 and 1} \]
   \[ 5 + y \]

b) \[ 5(11w) \]
   \[ (5 \cdot 11)w \quad \text{Assoc. Prop. of x} \]
   \[ 55w \quad \text{Multiply 5 and 11} \]

Practice for # 5 and # 6:
Simplify the expression. Explain each step.

1) \[ 10 + (a + 9) \]
2) \[ (c + 1.5) + 2 \]
3) \[ 5(4n) \]
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☐ I CAN… describe, identify and use the Properties of Zero and One.

The Properties of Zero and One describe what happens when we use zero and one in our addition and multiplication expressions.

The Addition Property of Zero states that the sum of any number and zero is equal to that number.
The Multiplication Property of Zero states that the product of any number and zero is zero.
The Multiplication Property of One states that the product of any number and 1 is that number.

Addition Property of Zero: \( a + 0 = a \)
Multiplication Property of Zero: \( a \cdot 0 = 0 \)
Multiplication Property of One: \( a \cdot 1 = a \)

Examples:
Simplify the expression. Explain each step.

a) \((a + 0) + 7\)  
   \(a + 7\)  + Prop. of 0

b) \(5(1 \cdot b)\)  
   \(5b\)  x Prop. of 1

Practice:
Simplify the expression. Explain each step.

1) \(12 \cdot b \cdot 0\)  
2) \(1 \cdot m \cdot 14\)  
3) \((t + 14) + 0\)

☐ I CAN… describe and identify the Distributive Property.

The Distributive Property states that to multiply a sum or difference by a number, you must multiply each number in the sum or difference by the number outside the parenthesis.

Distributive Property: \(a(b + c) = ab + ac\) \(a(b - c) = ab - ac\)

Examples & Practice:
Go to I CAN # 9 and # 10 for examples and practice.
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☐ I CAN… use the Distributive Property to find products of integers.

To use the Distributive Property to find products of integers, break the larger integer down into an addition problem that uses number that are easy to multiply. Then use the property and mental math to solve. Don’t forget to multiply each number in your addition by the number outside!

Example:
Use the Distributive Property to the product.

\[ 8 \times 53 = 8 \times (50 + 3) \]
\[ = (8 \times 50) + (8 \times 3) \]
\[ = 400 + 24 \]
\[ = 424 \]

Practice:
Use the Distributive Property to find the product.

1) \( 5 \times 41 \) 2) \( 9 \times 19 \) 3) \( 6(37) \)

☐ I CAN… use the Distributive Property to find products of fractions and mixed numbers.

To use the Distributive Property to find products of fractions and mixed numbers, break the mixed number into a whole number and a fraction. Then use the property and mental math to solve. Don’t forget to multiply each part by the number outside!

Example:
Use the Distributive Property to find the product.

\[ \frac{1}{2} \times 2 \frac{3}{4} = \frac{1}{2} \times (2 + \frac{3}{4}) \]
\[ = \left( \frac{1}{2} \times 2 \right) + \left( \frac{1}{2} \times \frac{3}{4} \right) \]
\[ = 1 + \frac{3}{8} \]
\[ = 1 \frac{3}{8} \]

Practice:
Use the Distributive Property to find the product.

1) \( \frac{2}{3} \times 1 \frac{1}{2} \)
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☐ I CAN…use the Distributive Property to simplify expressions.

To use the Distributive Property to simplify expressions, multiply each term by the number outside of the parenthesis and combine like terms (see I CAN #12). Don’t forget to multiply each number in your addition by the number outside!

**Examples:**

Simplify.

a) \[4(n + 5) = 4(n) + 4(5) = 4n + 20\]

b) \[12(2y - 3) = 12(2y) - 12(3) = 24y - 36\]

c) \[9(6 + x - 2) = 9(6) + 9(x) - 9(2) = 54 + 9x - 18 = 54 - 18 + 9x = 36 + 9x\]

**Practice:**

Simplify.

1) \[7(a + 2)\]  
2) \[3(d - 11)\]  
3) \[7(2 + 6 - 4d)\]
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☐ I CAN… simplify expression by combining like terms.

**Like terms** are parts of an expression that have the **same variable** component. To combine like terms, just add or subtract the coefficients. Remember, all constants are like terms because they all have no variable component.

**Examples:**

*Simplify.*

\[3x + 2y - 3 - x + 5x + 9 - y\]

Like terms: \(3x, x, \) and \(5x\)
\(2y, y\)
\(3, 9\)

Combine Like terms:
\(3x - x + 5x = 2x + 5x = 7x\)
\(2y - y = y\)
\(-3 + 9 = 6\)

Final Expression: \(7x + y + 6\)

**Practice:**

*Simplify.*

1) \(5p + 3p - 8\)  
2) \(3n - 5 + 2m - n + 3\)

3) \(3(b + 5) + b + 2\) (Hint: use the Distributive Property first)