# **Expressions and Equations Comprehension Check**

For questions 1-3, match each vocabulary term to the correct definition:

|  |  |
| --- | --- |
| 1. Equation | a. a placeholder for a number that is not known, usually represented by a letter |
| 2. Expression | b. a math sentence with an equal sign |
| 3. Variable | c. a combination of numbers, variables, and operations |

1. Equation –
2. Expression –
3. Variable –
4. Determine the variables, coefficients, constants, exponents, and number of terms in the following expression: x2 + 3y4 – 6 + 4z + 52.
   1. Variables:
   2. Coefficients:
   3. Constants:
   4. Exponents:
   5. Number of Terms:
5. What does it mean to evaluate an expression? Evaluate the expression b2 + 2 for b = 2, b = 4, and b = 6.
   1. b2 + 2 for b = 2 🡪
   2. b2 + 2 for b = 4 🡪
   3. b2 + 2 for b = 6 🡪
6. Use what you know about PEMDAS and combining like terms to simplify the expression 8x + 4x2 – 3x + 7 + 2x2.
7. How can substitution be used to solve the equation 10 - n = 7?
8. In general, how do you isolate the variable when solving equations?
9. Solve the following multi-step equation. Show your work and describe your thinking to support your answer.
10. Tara has saved $25 and earns another $5 each week. Write and solve an equation to determine how many weeks it will take Tara to save a total of $70.

# **Expressions and Equations Comprehension Check Answer Key**

For questions 1-3, match each vocabulary term to the correct definition:

|  |  |
| --- | --- |
| 1. Equation | a. a placeholder for a number that is not known, usually represented by a letter |
| 2. Expression | b. a math sentence with an equal sign |
| 3. Variable | c. a combination of numbers, variables, and operations |

1. Equation – b
2. Expression – c
3. Variable – a
4. Determine the variables, coefficients, constants, exponents, and number of terms in the following expression: x2 + 3y4 – 6 + 4z + 52.
   1. Variables: x, y, and z
   2. Coefficients: 3 and 4 (some students might also note 1 as the “invisible” coefficient in front of x2)
   3. Constants: 52 and 6
   4. Exponents: 2, 4, and 2
   5. Number of terms: 5
5. What does it mean to evaluate an expression? Evaluate the expression b2 + 2 for b = 2, b = 4, and b = 6.
   1. To evaluate an expression is to find its value when the variable is replaced by a specific number. For example, to evaluate the provided expression, we will replace a with different values, and then use what we know about PEMDAS and operations to solve.
   2. b2 + 2 for b = 2 🡪 22 + 2 🡪 (2 x 2) + 2 🡪 4 + 2 = 6
   3. b2 + 2 for b = 4 🡪 42 + 2 🡪 (4 x 4) + 2 🡪 16 + 2 = 18
   4. b2 + 2 for b = 6 🡪 62 + 2 🡪 (6 x 6) + 2 🡪 36 + 2 = 38
6. Use what you know about PEMDAS and combining like terms to simplify the expression 8x + 4x2 – 3x + 7 + 2x2.
   1. PEMDAS represents the order in which we apply operations to evaluate or simplify expressions and equations. Combining like terms requires us to add or subtract terms with the same variable parts.
   2. 8x + 4x2 – 3x + 7 + 2x2 🡪 we can use the associative property to rearrange the expression: 4x2 + 2x2 + 8x – 3x + 7 🡪 we can combine like terms: 6x2 + 5x + 7.
7. How can substitution be used to solve the equation 10 - n = 7?
   1. One way to solve equations is with substitution. This can be an efficient strategy when the numbers are simple or when patterns are easily recognizable.
   2. To solve 10 – n = 7 using substitution, we can try different values of n until the equation is true: 10 – **1** = 9, so false; 10 – **2** = 8, so false; 10 – **3** = 7, so true! In the equation 10 – n = 7, n = 3.
8. In general, how do you isolate the variable when solving equations?
   1. In general, it is best to isolate the variable by first evaluating any constants. For example, evaluate any terms with a nonvariable base and exponent. Next, use what you know about PEMDAS to apply opposite operations than those in the original equation. This will help “undo” certain steps, leaving you with the variable isolated on one side of the equation and its equivalent value on the other.
9. Solve the following multi-step equation. Show your work and describe your thinking to support your answer.
   1. Students’ strategies may differ, but most will likely evaluate and multiply both sides by 2 to get a simpler equation 5( + 3) = 50. Here, some students may divide both sides by 5 and then subtract 3, whereas others may use the distributive property before subtracting and dividing to find the solution. Regardless the strategy chosen, students should find that = 7.
10. Tara has saved $25 and earns another $5 each week. Write and solve an equation to determine how many weeks it will take Tara to save a total of $70.
    1. Equation: 25 + 5*w* = 70, where *w* represents the number of weeks
    2. Solve by isolating the variable: 25 + 5*w* = 70 🡪 subtract 25 from both sides: 5*w* = 45 🡪 divide both sides by 5: *w* = 9.