Algebraic Equations and Inequalities Module DBA & Exam Study Guide

These are study materials and not the exact topics/questions that will be asked on your DBA.

Please be prepared to discuss and apply ANY topic from the module.

Complete the tasks below to prep for your DBA.

1) Fill out all the Toolbox note guides for each module lesson
2) Review the vocabulary and/or formulas below.
3) Review the specific toolbox videos below and practice problems below

Note: these vocab words and problems are also located in the module lessons.

Vocabulary

1. **Algebraic Expression:** a mathematical statement that may include variables, _____, operations symbols, and grouping _____
2. **Base:** the number used as a _____ in exponential form
3. **Coefficient:** the number or constant that _____ a variable in an algebraic expression; if no number is specified, the coefficient is _____
4. **Exponent:** the number of times the base _____ as a factor
5. **Integer:** whole numbers and their _____
6. **Numerical Expression:** a mathematical statement consisting of _____ and _____ symbols
7. **Variable:** a letter that _____ a number

Vocabulary Review (2:16) #'s 1 through 7

Vocabulary Review (1:50) #'s 8 - 13

Vocabulary Review (1:02) #'s 14 - 17

Vocabulary Review (0:34) # 18

Vocabulary Review (0:45) #'s 19 - 20

Vocabulary Review (1:57) #'s 21

8. **Binomial:** a polynomial with _____ terms

9. **Distributive Property:** any number _____ to a sum or difference of numbers equals the sum or difference of the _____

10. **Linear Expression:** a polynomial expression or equation that contains a term of degree ____, but no term of _____ degree

11. **Monomial:** a polynomial with _____ term

12. **Term:** a single number, a single variable, or the _____ of several numbers or variables

13. **Trinomial:** a polynomial with _____ terms

14. **Common Factor:** a factor that all terms in an _____ have in common

15. **Factor:** one of the numbers or variables that are _____ together to produce a product

16. **Factoring:** taking a number or expression _____ and writing it as a _____ of two or more factor

17. **Greatest Common Factor (GCF):** the _____ expression that evenly _____ the given expressions

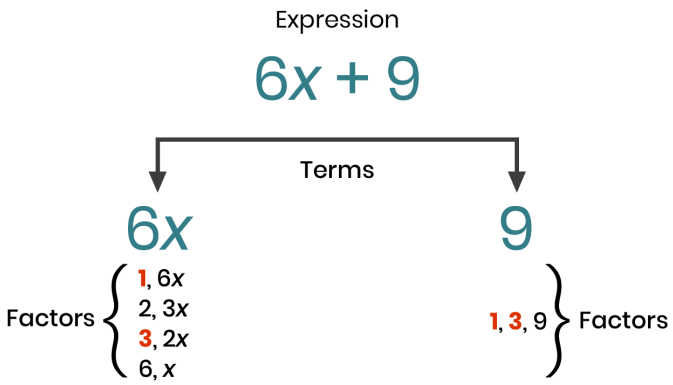
18. **Linear Equation:** a polynomial expression or equation that contains a term of degree _____, but no term of _____ degree

19. **Cube Root:** a factor of a number that, when _____ by itself _____ times, equals the original number

20. **Square Root:** a factor of a number that, when _____ by itself, equals the original number

21. **Linear Inequality:** _____ linear expressions compared using _____ symbols

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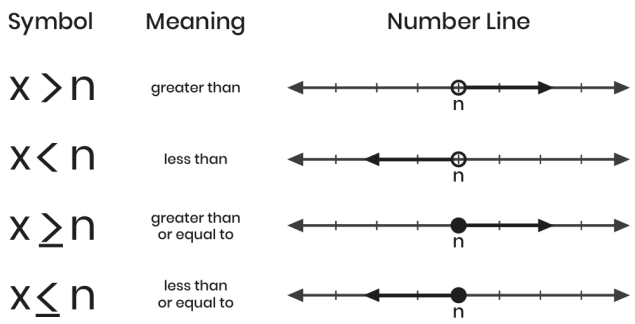
Formulas | Important Info	
Product of Powers Law: To multiply factors that have the same base, keep the base and add the exponents **Quotient of Powers Law:** To divide expressions that have the same base, keep the base and subtract the exponents **Negative Exponent Law:** To simplify an expression with a negative exponent, take the reciprocal of the base and rewrite the exponent as positive **Zero Exponent Law:** When the base has an exponent of zero, it is equal to one. **Power of a Power Law:** To raise an expression with an exponent to another exponent, keep the base and multiply the exponents **Power of a Product Law:** To raise a product to an exponent, raise each factor to the exponent **Power of a Quotient Law:** To raise a quotient to an exponent, raise the numerator and denominator to the exponent	
Steps to Rewrite Expressions using a Common Factor: • **Step 1:** Find a common factor • **Step 2:** Divide each term by the common factor • **Step 3:** Rewrite using the common factor. Write the common factor in front of the parentheses. Then place each of the new terms inside the parentheses with an addition or subtraction sign placed between them.	

Steps for Writing Two-Step Equations: • **Step 1:** Organize the math sentence into parts • **Step 2:** Determine which operations will be used • **Step 3:** Write the equation • **Step 4:** Check that your answer makes sense	
Steps for Solving Multi-Step Linear Equations: • **Step 1:** Begin by applying the distributive property or combining like terms if necessary • **Step 2:** Isolate the variable term using inverse operations of addition or subtraction • **Step 3:** Solve for the variable using inverse operations of multiplication or division • **Step 4:** Check the answer using substitution	
Types of Solutions: • **One solution:** One value will make the equation true. Example: x = 2 • **No solution:** No value will make the equation true. Example: 10 = 7 • **Infinite solutions:** All values will make the equation true. Example: 2x = 2x	
Steps to Solve Two-Step Inequalities: • **Step 1:** Isolate the variable term using inverse operations of addition or subtraction • **Step 2:** Solve for the variable using inverse operations of multiplication or division. ***Note** If dividing or multiplying both sides of the inequality by a negative value, reverse the inequality symbol. • **Step 3:** Check the answer using substitution.	

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Graphing Inequalities:

- The solutions can be graphed on a number line. An open circle represents < or > while a closed circle represents
- ≤ or ≥.
- **Step 1:** Plot an open or closed circle at the constant. Ex: x > 5, 5 would be the constant.
- **Step 2:** From the point, draw an arrow that points in the direction of the values that make the inequality true.



Practice Problems	Watch & Complete
1. Simplify $\left(\frac{x^{-1}y^{2}}{x^{-2}y^{4}}\right)^{2}$	Practice problem #1
2. 5x(2x + 10 - 4x)	Practice Problem #2
3. Factor $45x^{3}y^{4} - 35x^{2}y^{2}$	Practice Problem #3
4. $\frac{1}{4}(x - 4) = \frac{2}{3}x + 3$	Practice Problem #4
5. $x^{3} = -343 \quad x^{2} = 144$	Practice Problem #5

6. -3x + 5 > 23	**Practice Problem #6**
7. Alyson baked a rectangular cake for a party. The cake is 12 inches long. After cutting 8 identical pieces from it, she has 3 inches left. Write an equation that could be used to determine the length of each piece of cake. Explain how you know the equation is correct. Solve the equation. Show every step of your work.	**Practice Problem #7**