MAT 0024 - BASIC ALGEBRA

Catalog Description:

(5) (CC). Three hours lecture and a one-hour meeting with your assigned lab instructor each week along with one hour each week studying, doing homework, receiving tutoring, etc. in the Academic Resource Center. Prerequisite: MAT 0012 with a "C" or better or sufficient score on placement exam. This course includes basic algebra concepts and skills that are needed for success in higher level courses. Topics include operations with real numbers, polynomials, rational expressions, graphing, radicals, factoring and solving linear and quadratic equations and applications.

Performance Standards:

Upon successful completion of this course, the student will be able to:

1. Define the sets of real numbers including natural, whole, integer, rational and irrational numbers.
2. Find the absolute value of a real number.
3. Evaluate using exponential notation.
4. Add, subtract, multiply and divide integers.
5. Add, subtract, multiply and divide rational numbers in both fraction and decimal form.
6. Understand and use the properties of the real numbers (commutative, associative and distributive) including the special properties of 1 and 0.
7. Understand and use the order of operations over the natural, whole, integer and rational numbers.
8. Evaluate an algebraic expression by substitution.
9. Simplify an algebraic expression by collection of like terms.
10. Translate a phrase to an algebraic expression.
11. Solve linear equations in one variable using the addition and multiplication principles.
12. Solve application problems using linear equations.
13. Solve the 3 percent cases (finding a percent of a number, finding what percent one number is of another, finding the base) using a single percent equation.
14. Solve linear inequalities in one variable.
15. Understand and use the rules for exponents including writing a number in scientific notation.
16. Define polynomials with one or more variables including degree.
17. Add, subtract, multiply and divide polynomials including special products such as 2 binomials, conjugate binomials, and binomials squared.
18. Factor the greatest common factor given a polynomial.
19. Factor using grouping.
20. Factor trinomials of the type $ax^2 + bx + c$ where $a = 1$, by trial and error.
21. Factor trinomials of the type $ax^2 + bx + c$ where $a \neq 1$, by trial and error or the grouping method.
22. Factor the difference of two squares and perfect trinomial squares.
23. Solve quadratic equations using the factoring method.
25. Simplify rational expressions.
26. Solve a given proportion.
27. Set up and solve a proportion word problem.
28. Be familiar with the Cartesian plane and its quadrants.
29. Name and plot points on the Cartesian plane.
30. Determine x and y intercepts of lines.
31. Graph a line using the intercepts method or by plotting several points on the line.
32. Simplify square root radicals involving variables and numbers.
33. Addition and subtraction of like square root radical terms.
34. Use a scientific calculator for computations.

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1. Given \( A = \left\{ \frac{2}{5}, -4, \sqrt{5}, 0, 7, \pi, -\frac{1}{2} \right\} \) list the integers, rational numbers and irrational numbers.

2. Simplify using the order of operations
   a) \(-2 - |8 - 5| \cdot 3\)
   b) \(\frac{4(5) - (-2)}{(6)^2 - (8 - 3)^2}\)

3. Evaluate the expression \(2x^2 - 3y\) when \(x = 3\) and \(y = -4\).

4. Translate into an algebraic expression: Five subtracted from twice a number.

5. Name the property illustrated by the statement: \(2 + (3 + x) = (2 + 3) + x\)

6. Solve: \(\frac{2x}{3} + \frac{x}{9} = \frac{x}{3} + 4\)

7. In a high school band the number of boys is 15 more than the number of girls. If the total number of boys and girls in the band is 155, find the number of boys in the band and the number of girls in the band.

8. Find three consecutive odd integers whose sum is 675.

9. Use the formula \(F = \frac{9}{5}C + 32\) to convert the temperature 40°C to Fahrenheit.

10. Solve \(-2x + 3y = 7\) for \(y\)

11. 68.75 is 55% of what number?

12. Solve: \(10 - 4x \leq 30\)

13. Simplify: \((6x^2 y^5)(-5x^5 y^4)\)

14. Perform the indicated operation: \((5x^2 + 6x - 2) - (7x^2 - 4x - 1)\)

15. Perform the indicated operation: \((4x - 5y)(2x + 3y)\)

16. Factor using the GCF method: \(24m^4 n^2 p - 32m^2 n^3 p\)

17. Simplify: \(\frac{x^2 - 2x - 15}{x^2 - 9}\)

18. Solve: \(2x^2 + 5x + 3 = 0\)

19. Identify the \(x\)-intercept of the graph of \(2x - 5y = -10\). Write your answer as an ordered pair.

20. Simplify \(\sqrt[3]{12x^4 y^3}z\). Assume all variables represent positive real numbers.