



MAT121 Intermediate Algebra

Course Description: Operations/properties of real numbers, exponents and complex numbers; factoring, solution/application of linear and quadratic equations; operations on rational and radical expressions. *Prerequisite: MAT092 with a C or better.*

Recommended: RDG091

Measurable Student Learning Outcomes

1. (Application Level) Apply the appropriate rules of addition, subtraction, multiplication, and division with polynomials, rational expressions, and radical expressions and express the answer in the simplest form.

1. Subtract $(4x^2 + 2x - 10) - (-x^2 + 2x + 5)$
2. Add $\sqrt{48} + \sqrt{27}$
3. Subtract $\frac{x + 10}{x + 2} - \frac{4x + 6}{x - 2}$
4. Divide using long division $(x^2 + 2x - 24) \div (x - 4)$
5. Divide using synthetic division $x^3 + 4x^2 - 5x - 14 \div (x - 4)$
6. Given the following functions find $\frac{f(x)}{g(x)}$ and $f(x) \cdot g(x)$
 $f(x) = x^2 + 3x - 2$ $g(x) = -2x + 5$

2. (Application Level) Use various factoring techniques to completely factor polynomials, including GCF, grouping, factoring trinomials, difference of squares, sum and difference of cubes and applying the Zero Product Property.

1. Factor Completely.

$$x^3 + x^2 - 6x$$

2. $6x^2 - 5x - 4$

3. $5w^3 + 135$

4. $49x^2 - 81$

3. (Application Level) Identify if numbers are complex or real and add, subtract, multiply, and divide expressing answers in simplified standard complex form.

1. Subtract. $(5 + 2i) - (7 - 6i)$

2. Multiply $(2 + 3i)(4 - 6i)$

3. Divide $\frac{(2 + 3i)}{(2 - 2i)}$

4. (Application Level) Solve and express the answer in simplified standard complex form of quadratic equations and inequalities with complex solutions by factoring, completing the square, quadratic formula and graphing.

1. Solve $2x^2 - 8x = 0$

2. Solve by completing the square $2x^2 + x + 3 = 0$

5. (Application Level) Graph linear equations in two variables on the rectangular coordinate plane using point-slope form and slope intercept form to find the equation of the line when given the slope and y-intercept, the slope and a point, or two points on the line.

1. Find the linear equation given the y – intercept of $(0,10)$ and the slope of 2.

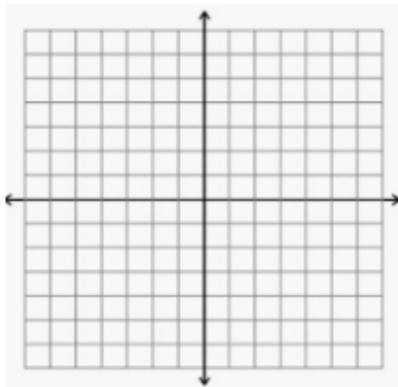
2. Write the linear equation whose graph contains the points $(-4,8)$ and $(6, -12)$.

3. Graph the equation $f(x) = -\frac{4}{5}x + 5$

6. (Application Level) Solve systems of linear equations in two or three variables by graphing, substitution and elimination and identify the solution given the graph.

1. Solve this system by graphing.

$$\begin{cases} 2y + x = 12 \\ y = \frac{5}{6}x - 2 \end{cases}$$

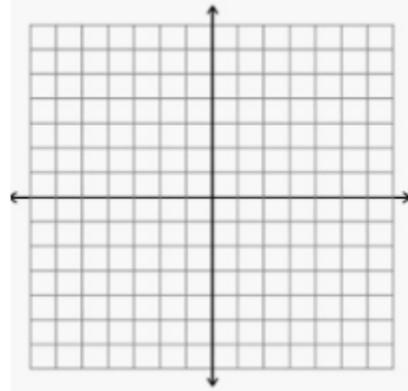


2. Solve this system by substitution or elimination.

$$\begin{cases} 7x + 2y = -4 \\ x - y = 5 \end{cases}$$

7. (Application Level) Solve and apply appropriate properties to find the solution to compound inequalities involving absolute value, quadratic expressions, and rational expressions.

1. Solve $-3 < -4x + 1 < 13$
2. Solve $|-3x + 2| + 4 < 14$
3. Solve by graphing $x^2 + 3x - 10 \geq 0$



8. (Comprehension Level) Demonstrate an understanding of exponential functions and their inverse relationship to logarithmic functions by conversion and graphing.

1. You have purchased a new car. The table below show the value of the car after n years.

n years.

n	$V(n)$
0	20000
1	17000
2	14450

Assume that the depreciation is exponential. Write the equation of the exponential model for this situation. Round any decimals to two places, use function notation

2. Rewrite this exponential equation in logarithmic form.

$$6^{-3} = \frac{1}{216}$$

3. Graph the function $f(x) = 2^x$.
Now find its inverse function and graph it also.

