Mathematics for College Liberal Arts
Unit 5 Project
Algebra

Instructions: Answer **ALL** questions. You **MUST** show all calculations and/or explanations to justify your answers. Upload the completed project as a Word or PDF file.

1. Perform the indicated operation for the expression: $(3x^2 + 2x + 1) - (x^2 - 2 + 2) + x(3x + 11)$

2. Solve the formula $A = \frac{(b_1 + b_2)}{2}h$ for h.

3. Solve the inequality $-2x < -6$, graph the solution on the number line, and write the solution in interval notation.

4. Graph $x^2 - 36$ and list the solutions to the quadratic equation.

5. Evaluate the function $f(x) = -3x + 21$ at the values $f(-2), f(-1), f(0), f(1)$, and $f(2)$.

6. Use the slope formula to find the slope of the line between (1, 4) and (3, 5).

7. Graph the line of $y = \frac{2}{3}x + 1$ using its slope and y-intercept.

8. Solve the systems of equations by elimination. $\begin{cases} y = \frac{1}{3}x - 6 \\ y = x - 3 \end{cases}$

9. Determine whether (0, 0) and (2, 3) are solutions to the system. $\begin{cases} 3x + y > 5 \\ 2x - y \leq 10 \end{cases}$

10. A toy maker makes exactly two toys out of wood; the Box (x) and the Bat (y). He makes \$5 per Box and \$6 per Bat. Each Box requires 30 ounces of wood, and each Bat requires 45 ounces of wood. Today the toy maker has 270 ounces of wood available. The toy maker also only makes 8 wooden toys per day. To maximize profit, how many of each wooden toy should the toy maker make?

    a. Find the objective function.

    b. Write the constraints as a system of inequalities.

    c. Graph of the system of inequalities.

    d. Find the value of the objective function at each corner point of the graphed region.

    e. To maximize profit, how many of each toy should the toymaker make?