Exercise 1

Tell me about yourself! (This exercise is optional and will not be graded.)

- Name and pronouns:
- Class, major, and/or any other relevant information:
- Reason for taking MAT 12:

1 Absolute Value, Intervals, Distance, and Linear Inequalities

Table 1

Complete the following table by filling in the missing cells either with the appropriate interval type, number line diagram, or inequality.
Consider the following equations:

\[ 3x + 1 = 2 \]
\[ t(1 + 2[1 - 2t]) = 4 \]
\[ y^2 + 3y + 1 = 0 \]

1. For each equation, what is the variable?

2. What is a solution? (Give a description or definition, don’t actually solve.)

3. Describe the steps you would take to solve the equation.

Exercise 3

Evaluate the following expressions. (Your answer can have \( x \) in it, but should not have any absolute values.)
Exercise 4

For each of the following inequalities, (a) solve, and (b) state the solution in interval notation.

1. $2x - 3 < 5$
2. $5t + 8 \leq 7(1 + t)$

Exercise 5

The conversion from Fahrenheit to Celsius is given by

$$F = \frac{9}{5}C + 32$$

where $F$ is the temperature in Fahrenheit and $C$ is the same temperature in Celsius.

If I know the temperature is below $40^\circ$ in Fahrenheit, what range is the temperature in Celsius?
Exercise 6

Solve the following absolute value inequalities. Give your answer (a) as an inequality, (b) in interval notation, and (c) on a number line.

1. \[ |1 - \frac{t}{2}| > 5 \]
2. \[ |7x - 10| \leq -9 \]

2 Quadratic Equations and Inequalities

Exercise 7

Solve each of the following equations, using the method of your choice. Indicate which method you are using, and show your work.
1. \(4x^2 - 9 = 0\)  
2. \(x^2 + 6x + 5 = 0\)  
3. \(x^2 + 6x + 7 = 0\)  
4. \(x^2 + 3x - 5 = 0\)  
5. \(x^3 + 3x^2 - 5x = 0\)

**Exercise 8**

Use the method of completing the square to solve the equation

\[ax^2 + bx + c = 0\]

(starting with dividing by \(a\)). What do you end up with? (Hint: it should look familiar!)
Exercise 9

Solve the quadratic inequalities:

1. \( x^2 + 3x - 4 \leq 0 \)
2. \( x^2 + 6x + 6 > 1 \)

3 Additional Recommended Exercises

1.1 41-54
1.2 1-60
1.3 1-15, 24-75
2.1 39, 40, 59-62