Notes for Test 2

(2.1 – 2.4, 7.1, 3.1 – 3.4)
You may NOT use these notes for the test, but they should help you study.

• Formulas to Know (2.1)
  o Distance Formula: \( d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \)
  o Midpoint Formula: \( \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \) This should be written as an ordered pair.
  o Know how to determine if points form a parallelogram

• Circles (2.2)
  o Standard Form: \( (x - h)^2 + (y - k)^2 = r^2 \)
    Remember that when you pull the center \((h, k)\) out of standard form, you have to change the signs!!!
  o General Form: \( x^2 + y^2 + ax + by + c = 0 \)
  o You need to be able to get from General Form to Standard Form (completing the square process)
  o Intercepts:
    ▪ \( x \)-intercept: set \( y = 0 \)  
    ▪ \( y \)-intercept: set \( x = 0 \)

• Equations of Lines (2.3 and 2.4)
  o Special cases:
    ▪ \( y = 4 \) (or any number) is a horizontal line with slope \( m = 0 \)
    ▪ \( x = -\frac{2}{3} \) (or any number) is a vertical line with slope = undefined
  o If directions say “Find an equation of a line,” you must start by using the point-slope formula: \( y - y_1 = m(x - x_1) \)
  o To find a slope given two points \( m = \frac{y_2 - y_1}{x_2 - x_1} \)
  o Forms of lines - Pay attention to the directions. Be sure to use the correct form!
    ▪ Point-slope Form: \( y - y_1 = m(x - x_1) \)
    ▪ Slope Intercept Form: \( y = mx + b \)
    ▪ Standard Form: \( Ax + By = C \) (A must be a positive number)
  o Parallel lines have the EXACT same slope
  o Perpendicular lines have slopes that are opposite in sign and are reciprocals of each other
  o Intercepts:
    ▪ \( x \)-intercept: set \( y = 0 \)  
    ▪ \( y \)-intercept: set \( x = 0 \)
  o You must be able to graph a line

• Systems of Equations (7.1)
  o 2-by-2 systems, use the elimination method
  o 2-by-2 systems, use the substitution method
  o Know how to set up a 2-by-2 system from a word problem
Notes for Test 2

(2.1 – 2.4, 7.1, 3.1 – 3.4)

You may NOT use these notes for the test, but they should help you study.

- **Functions (3.1 and 3.2)**
  - Know the difference between a polynomial, rational, and root functions
  - Finding the domain (without a graph)
    - Denominator of a fraction cannot equal 0 (≠ 0)
    - Even roots must be positive (≥ 0)
    - If there is an even root in the denominator, the root must be positive and cannot be 0 (>0)
    - Be sure to express in interval notation
  - Finding the domain and range (with a graph)
    - Domain is the set of \( x \)-values (how far left and right the graph goes)
    - Range is the set of \( y \)-values (how far down and up the graph goes)
    - Be sure to express in interval notation
  - Intervals of increasing, decreasing, and constant
    - Use only the \( x \)-values of the starting and stopping point
    - ALWAYS use parenthesis when writing the interval notation
  - Be able to determine if a function is even, odd, or neither
    - Even (with a graph) folds perfectly on the \( y \)-axis
    - Even (without a graph) set \( x = -x \) and simplify. If you get the original equation back, then it is even.
    - Odd (with a graph) rotate upside down and it is still the same as the original
    - Odd (without a graph) set \( x = -x \) and \( y = -y \) and simplify. If you get the original equation back, then it is odd.
    - If none of the above situations are true, the graph is neither even nor odd.

- **Transformations (3.3 and 3.4)**
  - Horizontal Shifts (number is inside parenthesis – shift opposite direction of the sign)
    - Shift Left \( y = (x + 3)^2 \) number is positive
    - Shift Right \( y = (x - 3)^2 \) number is negative
  - Vertical Shift (number is outside parenthesis – shift same direction of the sign)
    - Shift Up \( y = x^2 + 3 \) number is positive
    - Shift Down \( y = x^2 - 3 \) number is negative
  - Horizontal Stretches/Compressions (number is inside parenthesis)
    - Stretch \( y = \left( \frac{1}{5}x \right)^2 \) number is smaller than 1 (wider)
    - Compression \( y = (5x)^2 \) number is larger than 1 (skinnier)
  - Vertical Stretches/Compressions (number is outside parenthesis)
    - Stretch \( y = 5x^2 \) number is larger than 1 (skinnier, but taller)
    - Compression \( y = \frac{1}{5}x^2 \) number is smaller than 1 (wider, but shorter)
  - Reflections
    - About \( x \)-axis – multiply everything by -1
    - About \( y \)-axis – change \( x \) to a \(-x\)