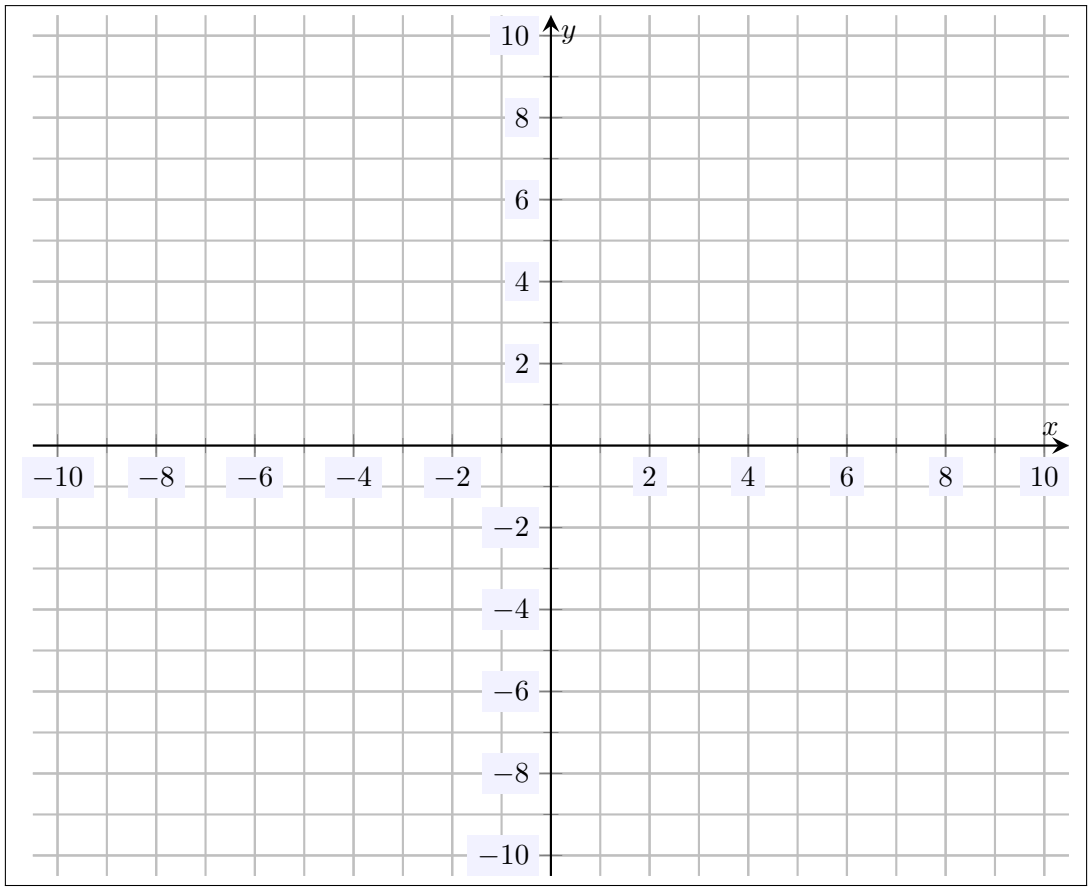
Name: _____

MATH 101
Summer 2022
HW 7: Due 06/07

"Science is simply common sense at its best, that is, rigidly accurate in observation, and merciless to fallacy in logic."

–Thomas Huxley

Problem 1. (10pt) Plot the quadratic function $y = 4 - (x + 6)^2$ as accurately as possible. Your sketch should include the vertex and axis of symmetry.



Problem 2. (10pt) Find the vertex form of $f(x) = x^2 - 12x + 41$. Also, find the vertex and axis of symmetry of $f(x)$.

Problem 3. (10pt) Find the vertex and axis of symmetry of $g(x) = -3x^2 + 24x - 37$.

Problem 4. (10pt) Consider the quadratic function $h(x) = 4x^2 - 12x + 6$.

(a) Determine if the parabola opens upwards or downwards.

(b) Is the parabola convex or concave?

(c) Does the parabola have a maximum or minimum?

(d) Find the vertex and axis of symmetry.

(e) Find the maximum/minimum value of $h(x)$.

Problem 5. (10pt) Consider the quadratic function $j(x) = -x^2 - 4x + 1$.

(a) Determine if the parabola opens upwards or downwards.

(b) Is the parabola convex or concave?

(c) Does the parabola have a maximum or minimum?

(d) Find the vertex and axis of symmetry.

(e) Find the maximum/minimum value of $j(x)$.

Problem 6. (10pt) Factor the following:

(a) $x^2 - 64$

(b) $4x - 20x^2$

(c) $9x^2 - 25$

(d) $5x^2 + 60x$

Problem 7. (10pt) Factor the following completely: $4x^2 + 20x - 24$

Problem 8. (10pt) Use completing the square to solve the following equation:

$$4x^2 = 16x - 24$$

Problem 9. (10pt) Solve the following quadratic equation by factoring:

$$10x = 24 - x^2$$

Problem 10. (10pt) Solve the following quadratic equation:

$$x(10 - x) = 25$$