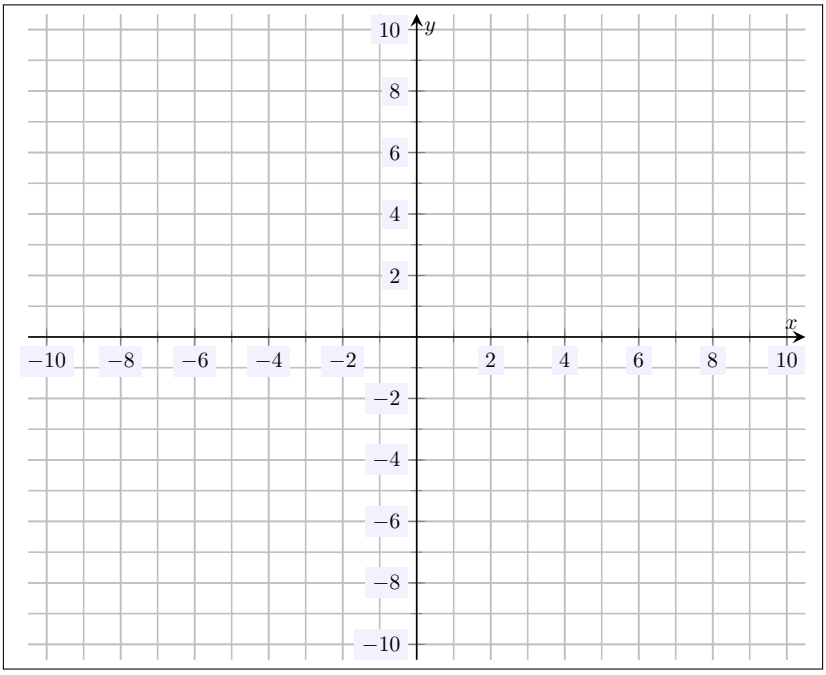
Name: _____

MATH 101
Fall 2023
HW 14: Due 12/06

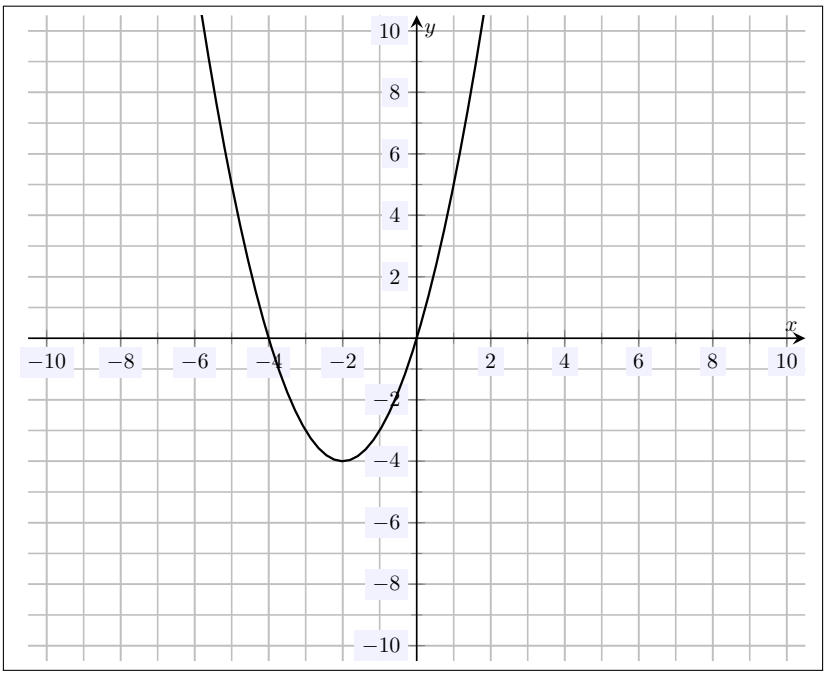
"Nature is written in mathematical language."

–Galileo Galilei

Problem 1. (10pt) Sketch the function $f(x) = 7 - (x-5)^2$.



Problem 2. (10pt) Find the equation of the quadratic function shown below. Be sure to fully justify why your answer is correct.



Problem 3. (10pt) Consider the quadratic function $f(x) = x^2 - 6x + 14$.

(a) Find a, b, c for this quadratic function.

(b) Does $f(x)$ open upwards or downwards? Explain.

(c) Is this quadratic function convex or concave? Explain.

(d) Find the minimum value of $f(x)$, if it exists. If it does not exist, explain why.

(e) Find the maximum value of $f(x)$, if it exists. If it does not exist, explain why.

Problem 4. (10pt) Consider the quadratic function $f(x) = 4 - 2(x-2)^2$.

(a) Find a, b, c for this quadratic function.

(b) Does $f(x)$ open upwards or downwards? Explain.

(c) Is this quadratic function convex or concave? Explain.

(d) Find the minimum value of $f(x)$, if it exists. If it does not exist, explain why.

(e) Find the maximum value of $f(x)$, if it exists. If it does not exist, explain why.