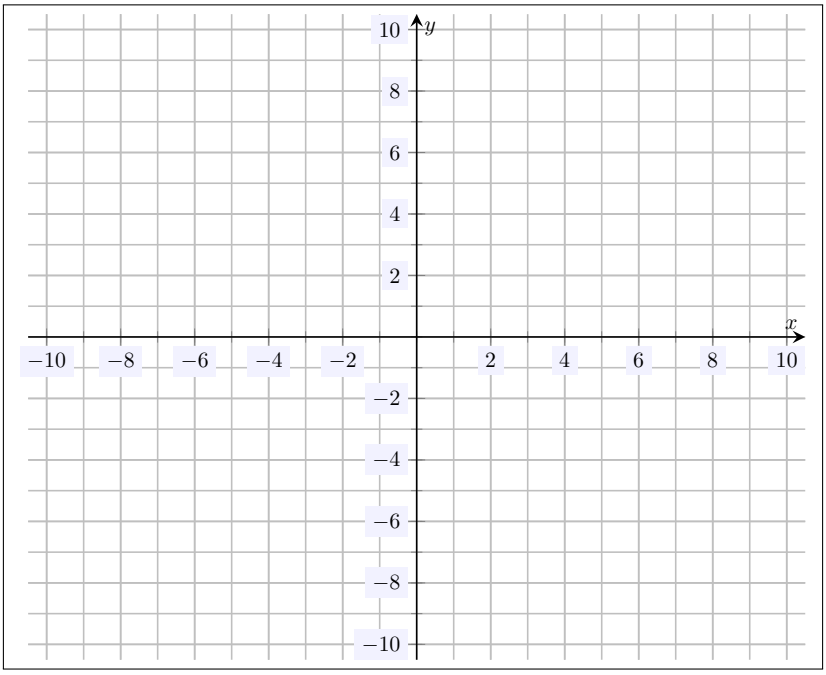
Name: _____

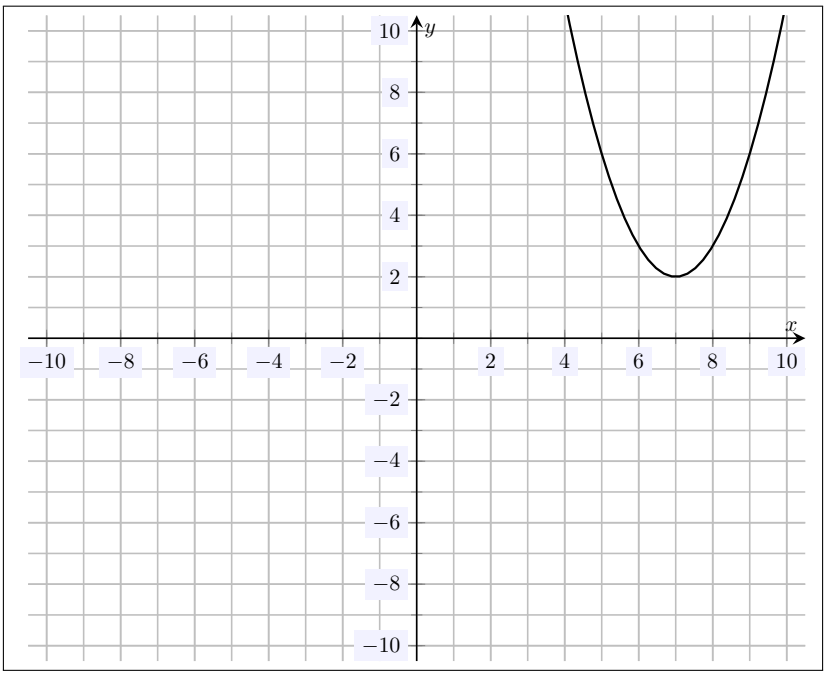
MATH 101
Spring 2024
HW 16: Due 04/10

"Mankind was born on Earth. . . it was never meant to die here."
— Joseph Cooper, Interstellar

Problem 1. (10pts) Sketch the function $f(x) = (x+6)^2 - 5$.



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



Problem 3. (10pts) Consider the quadratic function $f(x) = -x^2 - 4x + 12$.

(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. (10pts) Consider the quadratic function $f(x) = (x+3)^2 - 10$.

(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.