ALGEBRA 2 HONORS
PROBLEM SET #12

DUE DATE: OCTOBER 18, 2023; END OF CLASS

Question 1. Let $f(x) = -3(x+2)(x-4)$.

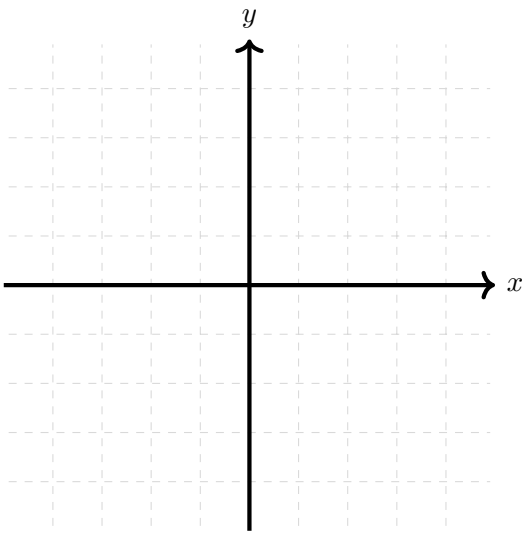
(a) Prove that $f(x)$ is a quadratic by FOILing out $f(x)$.

(b) Are the arrows of $f(x)$ facing **up** or **down**?

(c) Where is the **vertex** of $f(x)$?

(d) Where is the y-intercept? Where are the x-intercepts?

(e) Draw a graph of $f(x)$.



Question 2. Let $g(x) = x^2 + 6x - 8$.

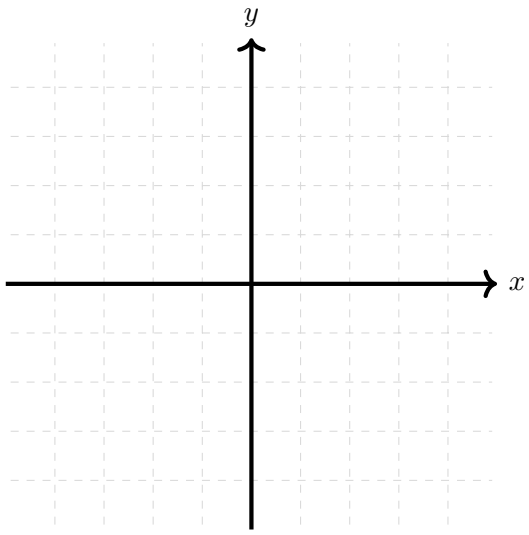
(a) Prove that $g(x)$ is a quadratic by FOILing out $g(x)$.

(b) Are the arrows of $g(x)$ facing **up** or **down**?

(c) Where is the **vertex** of $g(x)$?

(d) Where is the y-intercept? Where are the x-intercepts?

(e) Draw a graph of $g(x)$.



Question 3. You manufacture and sell widgets for a living. Your profit is modeled by the relation $P(x) = -3x^2 + 240x - 800$ where $x =$ number of widgets manufactured per day.

How many widgets should you manufacture to maximize the profit? What is the maximum amount of profit?

Question 4. Let $f(x) = -3(x - 15)(x + 2023)$. Using a sign diagram, determine when $f(x) > 0$ and when $f(x) < 0$.

Question 5. Factor the following:

(a) $x^2 + 2x + 1$
(b) $x^2 + 3x + 2$
(c) $x^2 + 15x + 16$
(d) $x^2 - 7x + 12$
(e) $x^2 - 81$
(f) $x^2 - x - 2$