ALGEBRA 2 HONORS
PROBLEM SET 5

DUE DATE: FEBRUARY 8, 2024

Question 1. Find the partial fraction decomposition for
$$\frac{3x + 11}{x^2 - x - 6}$$

Question 2. One of the zeros of a polynomial function is 1. After translating the graph of the function left 2 units, 1 is a zero of the new function. What do you know about the original function?

Question 3. A function $f(x)$ has a zero at $x = 1$, a horizontal asymptote of $y = \dfrac{2}{3}$, and a vertical asymptotes at $x = -4$.
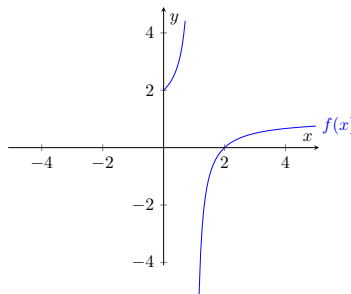
Define a few different functions:

$$p(x) = 2 \cdot f(x + 5)$$
$$q(x) = -f(-x)$$
$$r(x) = \frac{2}{f(x)}$$

Find any zeros (roots), horizontal asymptotes, and vertical asymptotes of the new functions.

Question 4. Graph each of the transformed functions assuming $f(x)$ is the graph below:

Sketch the graph of $f(-x)$, $-f(x)$ and $f(x + 2)$

Question 5. Simplify $\sqrt{108}$ and $\sqrt{875}$ using prime factorization.

Question 6. Simplify the following expressions:

(a) $(81x^4)^{-1/4}$

(b) $\left(\dfrac{x^{1/4}}{y^{-3/4}}\right)^{12}$

(c) $\sqrt{8} + \sqrt{18} + \sqrt{98}$

Question 7. Simplify the expression $\left((2a)^{1/3}(a^2b)^{1/3}\right)^3$.

Question 8 (6 marks)**.** Write each of the following as a power of 2, e.g. write 2 as 2^1.

(a) 2×2^{-4}

(b) $\dfrac{16}{2^{-3}}$

(c) 8^5

(d) 32

(e) $\dfrac{1}{32}$

(f) $8^x \times 4$