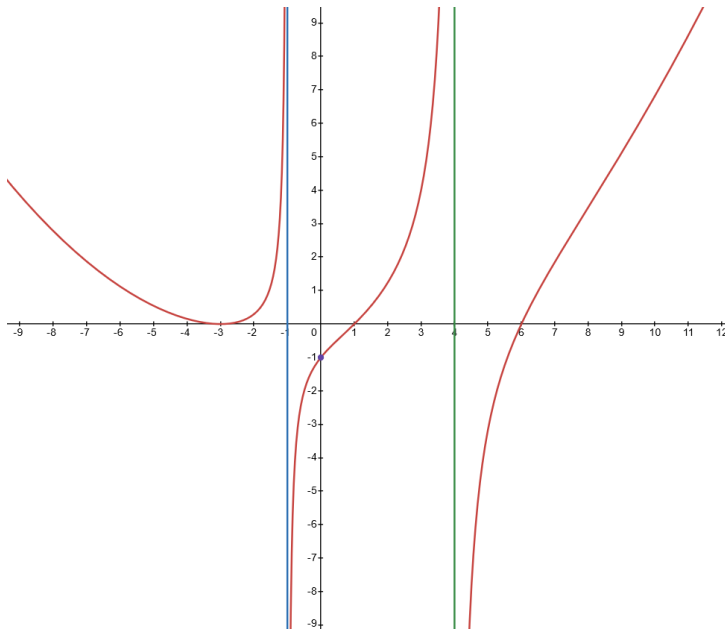


YOUR NAME: _____

Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Consider a function $y = f(x)$ whose graph is shown in the figure.



(a) Find the vertical asymptotes.

(b) Find the horizontal asymptote.

(c) Find the x -intercepts.

(d) Find the y -intercept.

(e) Create the sign table.

(f) Find a possible formula for $y = f(x)$.

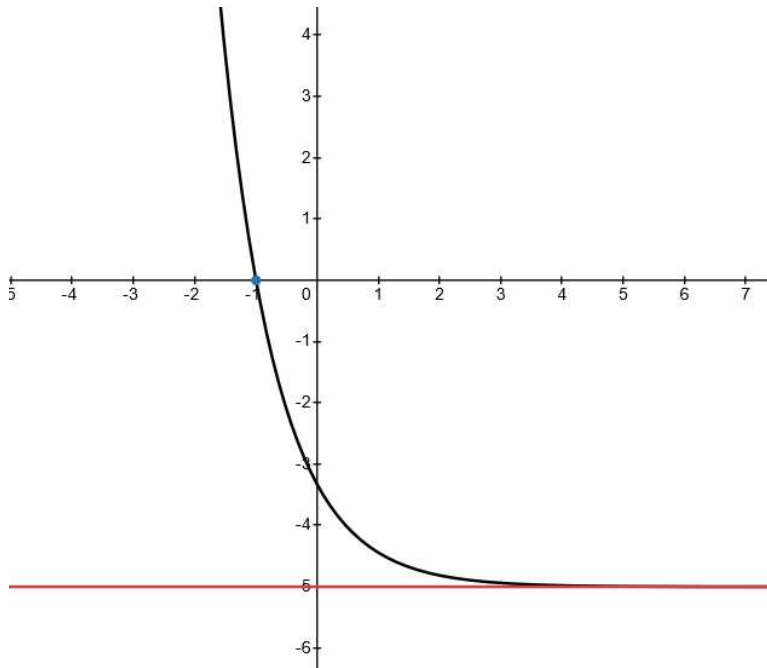
2. Find the domain of the function

$$f(x) = \sqrt{\frac{x^2(x+5)}{(x+1)(x-3)}}.$$

3. (a) A variable y varies directly with x and the cube of z and inversely with the square root of w . When $x = 5$, $z = 2$ and $w = 4$, then $y = 30$. Find the relation of joint variation.

(b) A population numbered 25 individuals in 2010. By 2017 it had dropped down to only one individual. If it was observed that the population was following an exponential decline, find a formula for the population $P(t)$ at time t .

4. Consider the exponential function with base $b = 3$ whose graph is shown in the figure. Find a possible formula for the function showing all steps.
(Do not assume any values other than ones explicitly shown.)



5. In this problem you may use your calculators. However, do not show any numbers without previously writing down the expressions from which those numbers were computed.

(a) At the beginning of 2020, Leo invested an amount in an account yielding 6% annually, compounded monthly, so as to have \$60,000 in 2040 to contribute to his son's college tuition. How much did Leo have to invest in the account?

(b) At the end of 2024, Leo ran into hard times and decided to tap into the account. How much was available in the account by that time?