Quiz 11

1. Let $f(x) = \dfrac{x^2 - 1}{x^3 + x^2 - 4x - 4}$

$$= \frac{(x+1)(x-1)}{(x^2-4)(x+1)} = \frac{\cancel{(x+1)}(x-1)}{\cancel{(x+1)}(x+2)(x-2)} = \frac{x-1}{(x+2)(x-2)}$$

a) What is the domain of $f(x)$? $\underline{x \neq -1, 2, -2}$

b) What are the vertical asymptotes? $\underline{x = 2, -2}$

c) What is the horizontal asymptote (if any)? $\underline{y = 0}$

d) Where is the hole? $x = \underline{-1}$ $y = \underline{2/3}$

e) Where is the y-intercept? $\underline{(0, 1/4)}$

f) Where is/are the zero(s) (or x-intercepts)? $\underline{(1, 0)}$

g) Make a sign chart to find when $f(x)$ is positive and negative (hint: critical points are zeroes and vertical asymptotes)

$$\overset{\displaystyle -\quad\ \ +\quad\ -\ \ +}{\underset{\displaystyle -2 \qquad\quad 1\ \ 2}{\longleftrightarrow}}$$
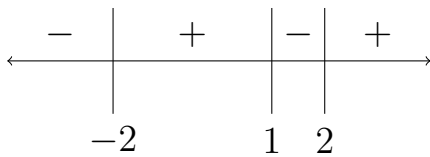
h) Graph $f(x)$ below
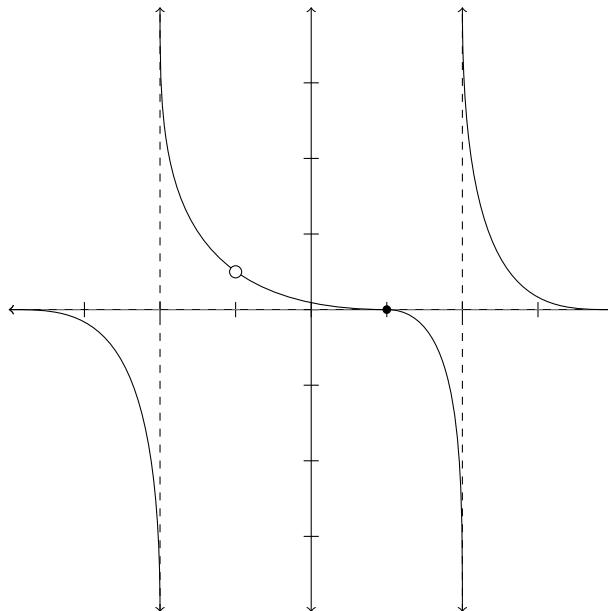
2. Solve for x

a) $\dfrac{9^3}{27^x} = 1$

   Answer.

$$\frac{(3^2)^3}{(3^3)^x} = 3^0$$

$$\frac{3^6}{3^{3x}} = 3^0$$

$$3^{6-3x} = 3^0$$

$$6 - 3x = 0$$

$$6 = 3x$$

$$x = 2$$

$$x = \underline{2}$$

□

b) $\left(\dfrac{1}{32}\right)^2 = \dfrac{8^x}{2^{(x^2)}}$

   Answer.

$$\left(\frac{1}{2^5}\right)^2 = \frac{(2^3)^x}{2^{(x^2)}}$$

$$(2^{-5})^2 = 2^{3x-x^2}$$

$$-10 = 3x - x^2$$

$$x^2 - 3x - 10 = 0$$

$$(x-5)(x+2) = 0$$

$$x = \underline{x = 5, -2}$$

□

3. What math class (if any) will you be taking in the fall?

   _____

4. What was your favorite part of this class?

   <u>ALL OF IT</u>