Math 1050 CBE 3 Review

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Problem 1

Determine the exact coordinates for the vertex and the exact coordinates for the x-intercepts of the parabola defined by the function $f(x) = \frac{5}{12}x^2 - \frac{5}{6}x + \frac{2}{3}$.

- Vertex:

- X-intercepts:

Solution:

Vertex at $\left(1, \frac{1}{4}\right)$, no x-intercepts

Problem 2

Determine an equation for the parabola that has a vertex at the point $(2, 4)$ and contains the point $(-3, 1)$.

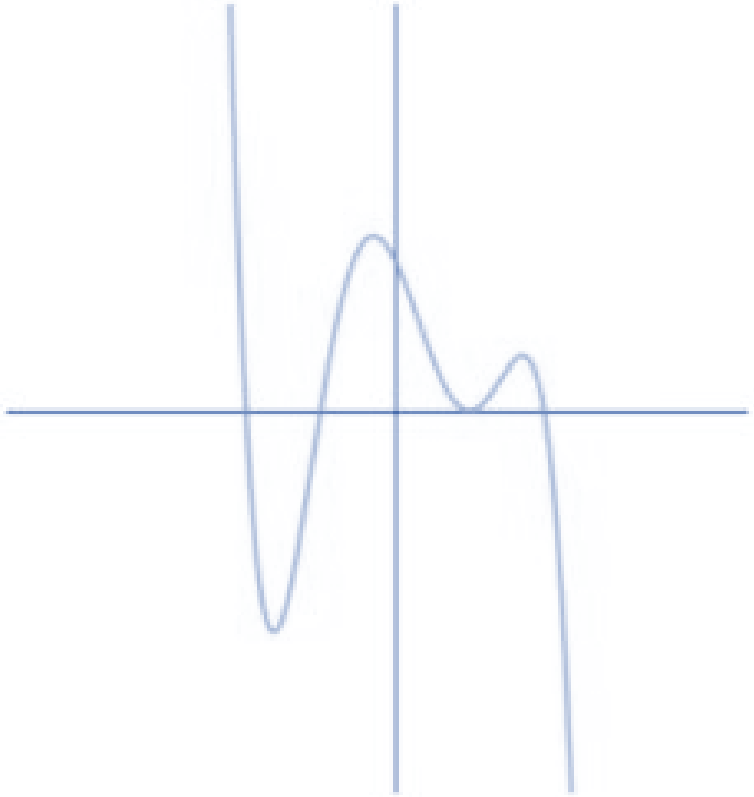
- Determine the y-coordinate for the point where the parabola intersects the y-axis.

- Solutions:

$$f(x) = -\frac{3}{25}(x-2)^2 + 4, \qquad \frac{88}{25}$$

Problem 3

- Choose the function from the following whose graph is shown, assuming A, B, C, and D are all positive real numbers.
- $h(x) = A(x + B)(x + C)(x + D)(x + E)$
- $k(x) = -A(x - B)(x - C)^2(x + D)^2$
- $j(x) = A(x - B)(x - C)^2(x - D)^2$
- $f(x) = -A(x - B)(x - C)^2(x + D)(x + E)$



Solution: f(x)

Problem 4

- Use polynomial division to write the rational expression as a polynomial of descending powers plus a remainder term.

$$\frac{3x^4 - 6x - 4}{x^2 - 2}$$

Solution:

$$3x^2 + 6 + \frac{-6x+8}{x^2-2}$$

Problem 5

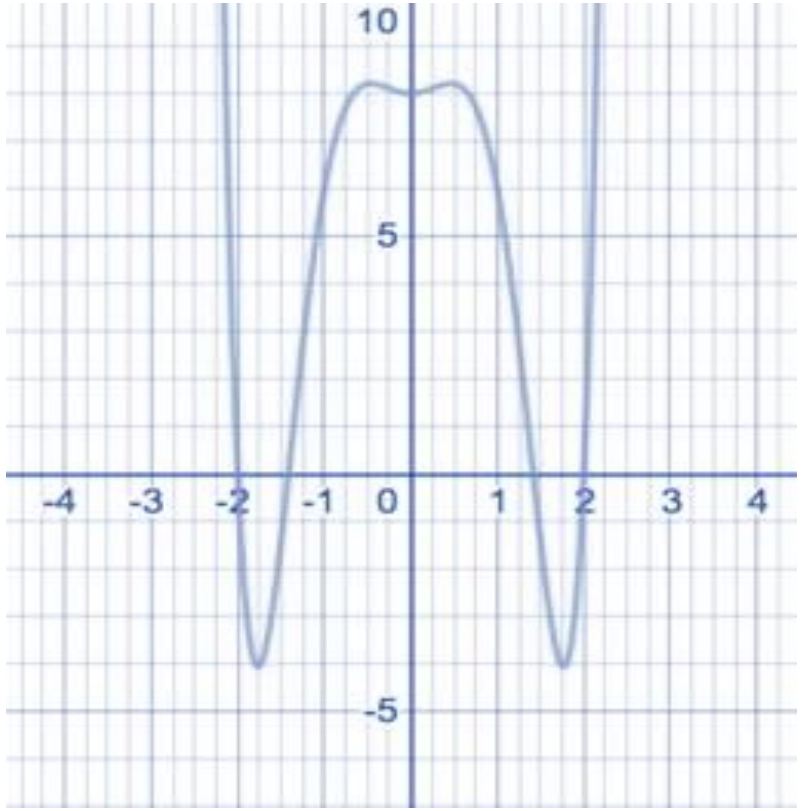
- Find all rational zeros of the function $f(x) = 2x^3 + 5x^2 + 4x + 1$.

Solution: $x = -1, -\frac{1}{2}$

Problem 6

- Determine how many rational, irrational, and imaginary zeros the following function has:
- $f(x) = x^6 - 5x^4 + 2x^2 + 8$

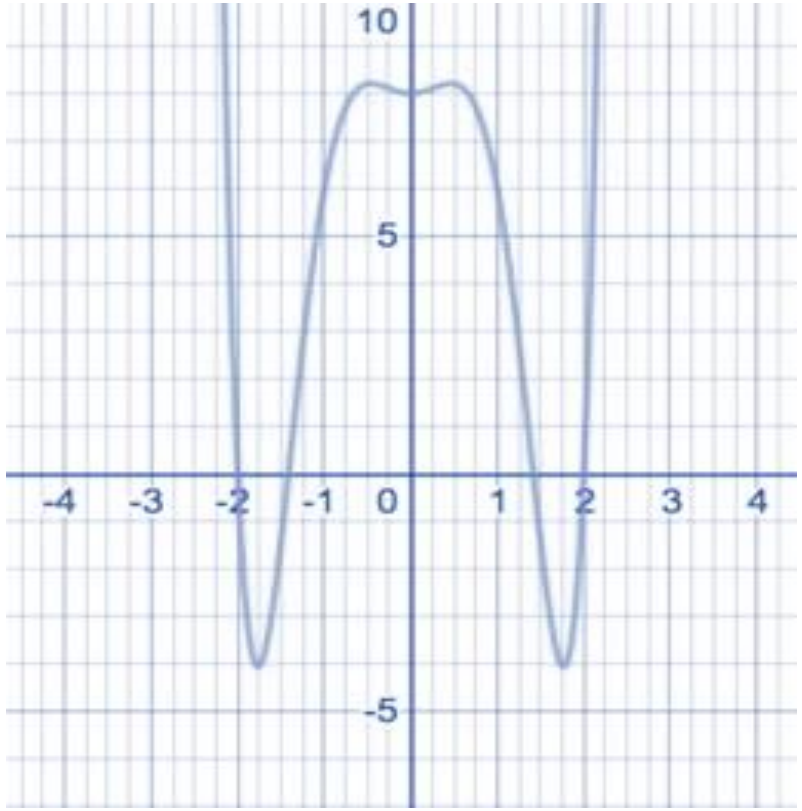
Rational Zeros:	
Irrational Zeros:	
Imaginary Zeros:	



Problem 6 - Solution

- Determine how many rational, irrational, and imaginary zeroe the following function has:
- $f(x) = x^6 - 5x^4 + 2x^2 + 8$

Rational Zeros:	2
Irrational Zeros:	2
Imaginary Zeros:	2



Problem 7

Find all complex zeros of the polynomial

$$f(x) = x^4 - 2x^3 + 3x^2 - 10x - 10.$$

- Hint: one of the zeros has a value of $\sqrt{5}i$

Solution: $\{\sqrt{5}i, -\sqrt{5}i, 1 - \sqrt{3}, 1 + \sqrt{3}\}$

Problem 8

Does the graph of the following function contain any holes? If so, what are the coordinates for the holes?

$$f(x) = \frac{x^2+x-2}{x^2-3x+2}$$

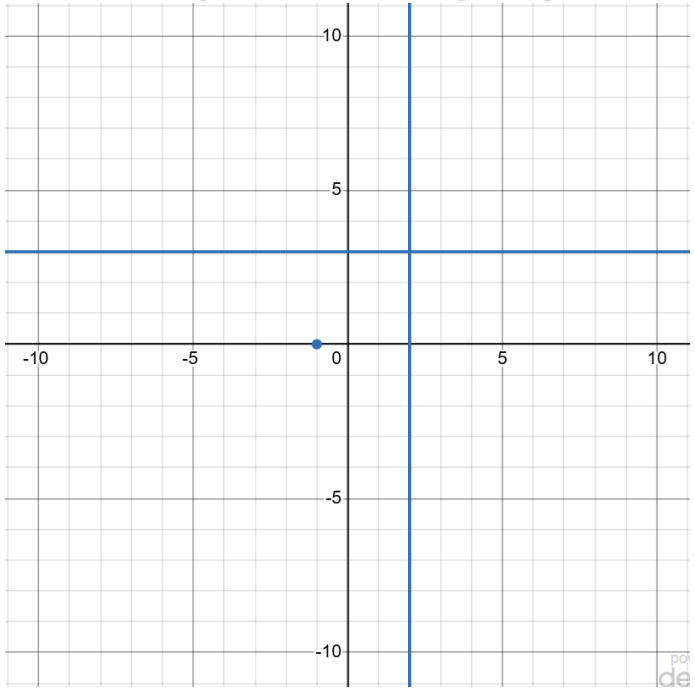
Solutions: Yes, $(1, -3)$

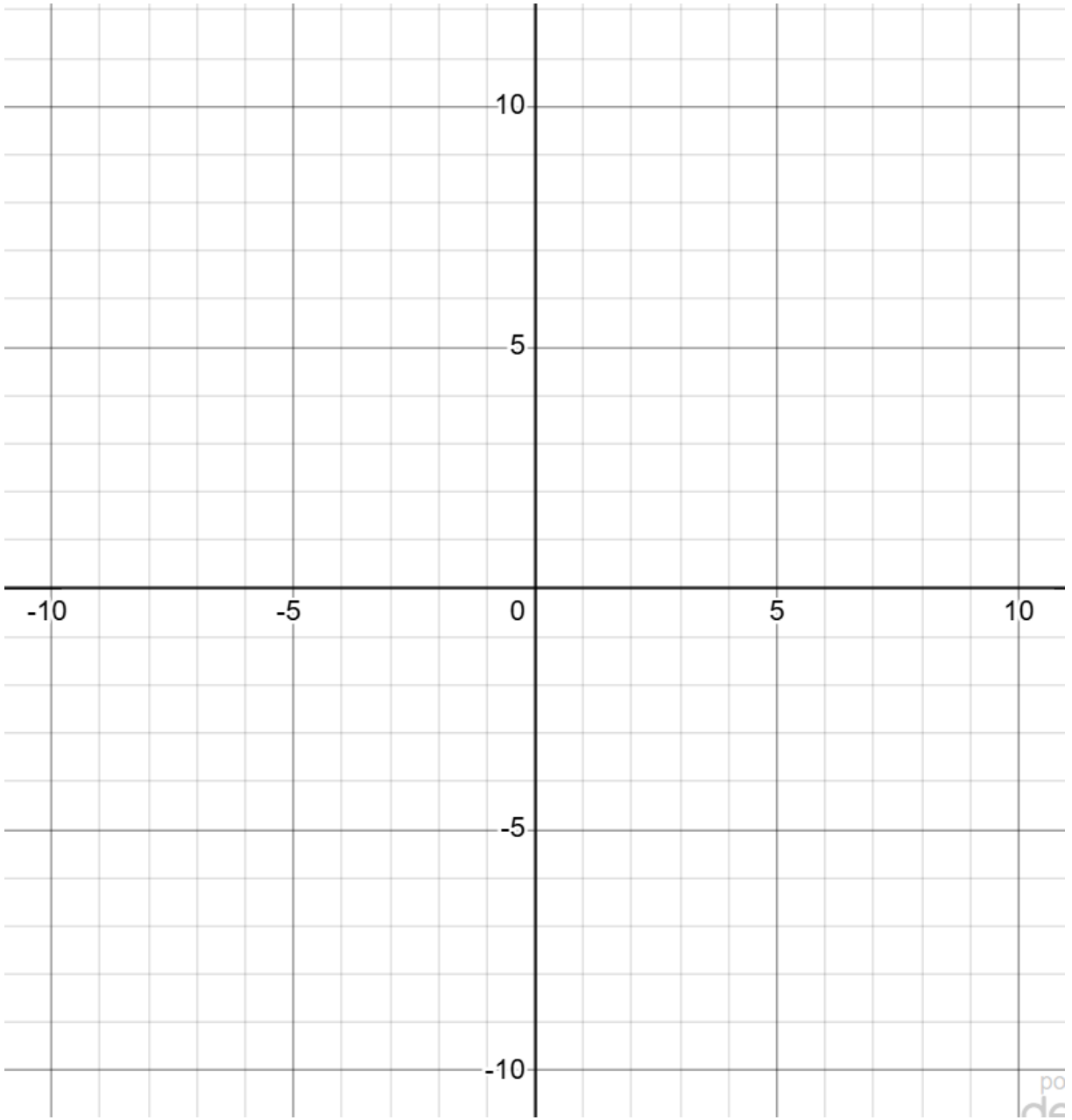
Problem 9

For the function $f(x) = \frac{3x^2+9x+6}{x^2-4}$,

- Plot all horizontal asymptotes,
- Plot all vertical asymptotes,
- Plot all zeros (x-intercepts).

Solution:





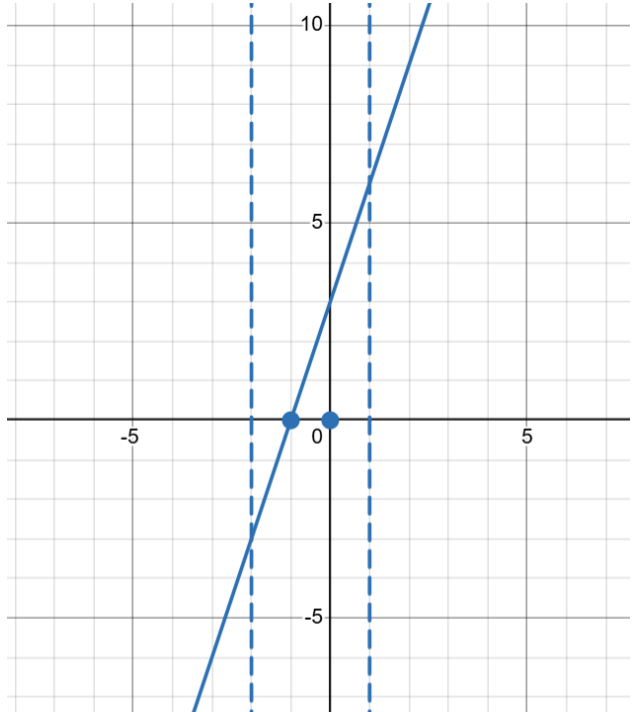
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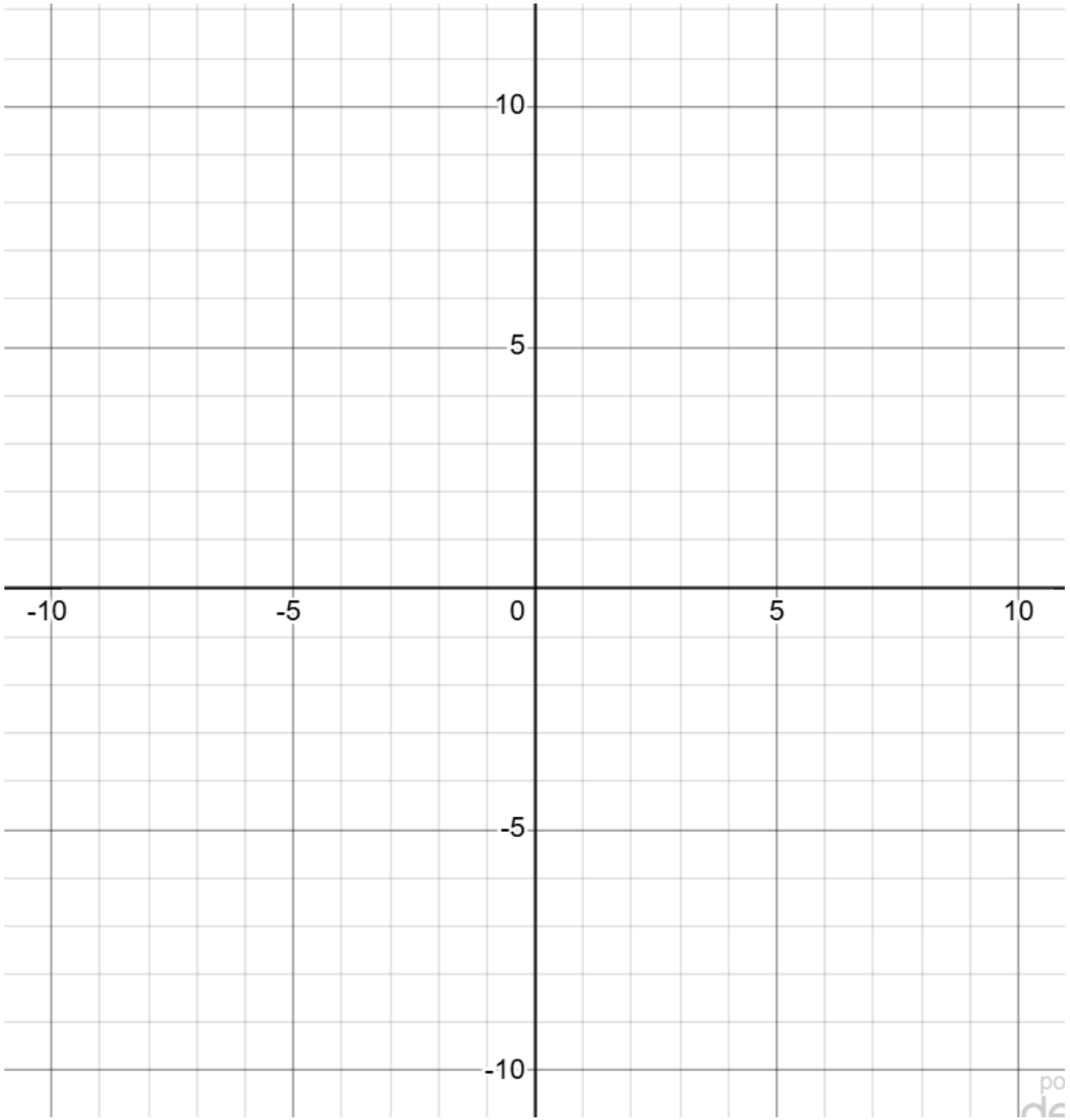
Problem 10

For the function $f(x) = \frac{3x^3+6x^2+3x}{x^2+x-2}$,

- Plot all vertical asymptotes,
- Plot the slant asymptote,
- Plot all zeros (x-intercepts).

Solution:





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- Visit usu.edu/math/amlc for more videos, resources, tutoring times, and recitation leader office hours