Math 3304 Mid-semester Exam Spring 2021

NAME:

5point penalty for no name.

Use this answer sheet please, use black or dk blue ink. If it's illegible and needs to be redone, there will be an irritation penalty imposed.

If you use your own paper and don't put in the point values, again a penalty.

Open book, notes, internet. No fair talking to anyone other than your ficus plant, cat, or toddler. No open mouth on this.

Due on Thursday the 25th! Don't be late. There's a late penalty that is substantial.

Tell me everything about $\quad f(x) = \dfrac{2x+3}{x-6}$.

Domain, range, all asymptotes, all intercepts, where its increasing and decreasing, and any turn around points. Sketch the graph on the next page.

Graph:

Problem 2   15 Points
_____

Compute the first eight terms in the sequence: $a_n = (-1)^n (1 - n^{-1})$
(n is a natural number)

Discuss the bounds for this sequence. Graph the first 8 terms.

Problem 3   15 points

Given: $f(x) = -(x-5)(x+2)$

List the domain, range, all intercepts. Give the point coordinates of the vertex and discuss where the graph is increasing and decreasing. Next page on graph.

Graph:

Given: $f(x) = x^3(x-4)(x+1)^2$

List the domain, range, all intercepts, all asymptotes. Sketch the graph on this page

Write a brief paragraph about each of the following statements. If it's true, state how you know. If it's false, show a counterexample and rewrite it so it's true.

A.   The set A = {1, 2, 3} and the set B = {0, 1}. The set A x B is not a function.

B.   Given $f(x) = \sqrt{x+6}$, the domain is $[-6, \infty)$.

C.   The sequence $a_n = \dfrac{4n+1}{n^2}$ is bounded above by 5.

D.   The domain for $f(x) = \dfrac{x^2 + 9x + 8}{x^2 + 5x + 4}$ is $(-\infty, -4) \cup (-4, \infty)$.

E.   The end behavior for $f(x) = -x^5 + 3x^4 - x^3 + 2x^2 - 7$ is $\uparrow\uparrow$.

EC1   6 points

EC1 – A.   In a certain arithmetic sequence a = –4 and d = 6. Given that
               $a_n = 62$, find n. Show your work

EC1 – B.   Is the sequence 11, 25, 39, 53…arithmetic, geometric or neither.
               Justify your answer by showing (a, d) or (a, r) or discuss why it's
               neither.
               Show the formula for the nth term.

EC 2   6 points

What is a likely function for the following graph?