MAT 21A, Fall 2021
Homework 3
Due before 2:10 on Wednesday, October 13

Please write the homework solutions in connected sentences and explain your work. Mark the answers to each question. Scan or take pictures of your homework and upload it to Gradescope before due time.

1. Find the limit $\lim_{x \to 1} \arccos(\ln(\sqrt{x}))$.

2. Show that the function $F(x) = (x-1)^2(x-5)^2 + x$ takes on value 3 for some value of x.

3. Compute the limit

$$\lim_{x \to +\infty} \frac{3x^3 + 2x^2 - 5x + 1}{-2x^3 + x^2 - 4x + 7}.$$

4. Consider the function $f(x) = \frac{3}{2}\left(\frac{x}{x-1}\right)^{\frac{3}{4}}$.

   a) Find the domain of $f(x)$.

   b) How does the graph behave as $x \to 0$?

   c) How does the graph behave as $x \to +1$ and $x \to -1$?

   d) Find the vertical and horizontal asymptotes for $f(x)$.

   e) Sketch the graph of $f(x)$.