

Math 180 Written Homework

Assignment #2

Due **Tuesday, September 9th** at the beginning of your discussion class.

Directions. You are welcome to work on the following problems with other MATH 180 students, but your solutions must be hand-written and by your own hand. The list of problem solutions is to be submitted to your TA at the beginning of the discussion class listed above. An answer without proper justification will receive little to no credit. No late homework will be accepted.

- On a set of axes, draw a function $f(x)$ that satisfies the following properties.
 - The domain of f is $x > 0$.
 - $\lim_{x \rightarrow 0^+} f(x) = -\infty$
 - $\lim_{x \rightarrow 2^-} f(x) = +\infty$
 - $\lim_{x \rightarrow 2^+} f(x) = +\infty$
- For each of the following limits, draw a sketch of the function near the indicated value and then find the limit based on your sketch.
 - $\lim_{x \rightarrow -2^+} \ln(x + 2)$
 - $\lim_{x \rightarrow 0} \ln|x|$
 - $\lim_{x \rightarrow 0} \frac{x}{e^x - 1}$
- Find all vertical asymptotes of the following functions.
 - $\ln(x + 2)$
 - $\ln|x|$
 - $\frac{x}{e^x - 1}$
- Evaluate the following limits.
 - $\lim_{\theta \rightarrow 0^-} \theta^3 \cos\left(\frac{2}{\theta}\right)$
 - $\lim_{\theta \rightarrow 0^+} \theta^3 \cos\left(\frac{2}{\theta}\right)$
- Evaluate $\lim_{x \rightarrow 1} \frac{x - 1}{x^3 - 1}$ or state that it does not exist.
- Evaluate the following limit

$$\lim_{t \rightarrow 0} \frac{\frac{1}{2 + \sin t} - \frac{1}{2}}{\sin t}$$

or state that it does not exist.