

3. [9 points] Consider the function h defined by

$$h(x) = \begin{cases} \frac{60(x^2 - x)}{(x^2 + 1)(3 - x)} & \text{for } x < 2 \\ c & \text{for } x = 2 \\ 5e^{ax} - 1 & \text{for } x > 2 \end{cases}$$

where a and c are constants.

a. [5 points] Find values of a and c so that both of the following conditions hold.

- $\lim_{x \rightarrow 2} h(x)$ exists.
- $h(x)$ is not continuous at $x = 2$.

Note that this problem may have more than one correct answer. You only need to find one value of a and one value of c so that both conditions above hold. Remember to show your work clearly.

Answer: $a =$ _____ and $c =$ _____

b. [2 points] Determine $\lim_{x \rightarrow -\infty} h(x)$. If the limit does not exist, write DNE.

Answer: $\lim_{x \rightarrow -\infty} h(x) =$ _____

c. [2 points] Find all vertical asymptotes of the graph of $h(x)$. If there are none, write NONE.

Answer: Vertical asymptote(s): _____