

Math 131 - Quiz 1 (IC)

August 24, 2022

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (1.5 points) Use a table of values to estimate the following limit. Your table must show function values at four or more points.

$$\lim_{x \rightarrow 1} \frac{|x|}{x^2 + 4x}$$

$$\text{Let } f(x) = \frac{|x|}{x^2 + 4x}$$

x	f(x)
0.9	0.204082
0.99	0.200401
0.999	0.200400
1.1	0.196078
1.01	0.199601
1.001	0.199960

Looks like

$$\lim_{x \rightarrow 1} \frac{|x|}{x^2 + 4x} = 0.2$$

2. (1.5 points) Use a table of values to estimate the following limit. Your table must show function values at four or more points.

$$\lim_{x \rightarrow 0} \frac{|x|}{x^2 + 4x}$$

$$f(x) = \frac{|x|}{x^2 + 4x}$$

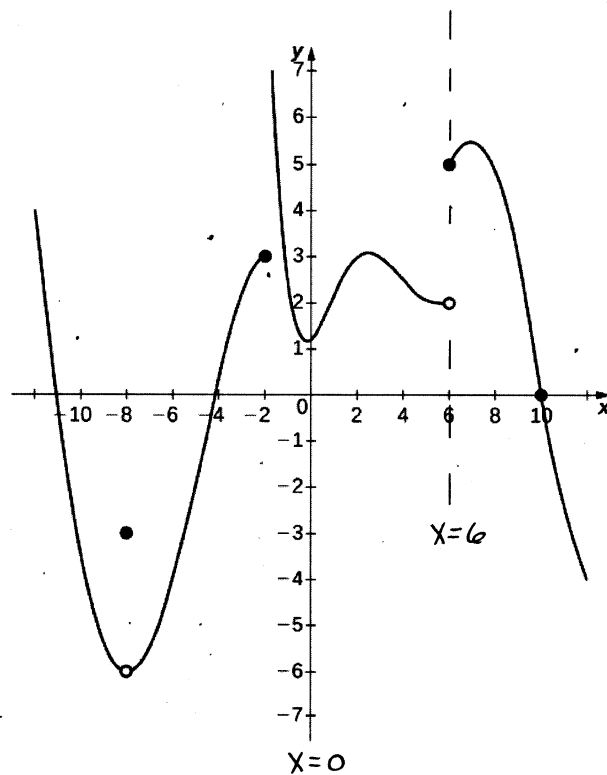
x	f(x)
0.1	0.243902
0.01	0.249377
0.001	0.249938
-0.1	-0.256410
-0.01	-0.250627
-0.001	-0.250063

Looks like the limit DNE

because limit from the right is not equal to limit from the left.

Turn over.

3. (2 points) The graph of the function f is shown below. Use the graph to estimate each limit.



(a) $\lim_{x \rightarrow 0} f(x) \approx 1.2$

(b) $\lim_{x \rightarrow 6} f(x)$ DNE

LIMIT FROM RIGHT = 5

LIMIT FROM LEFT = 2

Math 131 - Quiz 1 (TH)

August 24, 2022

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due August 29.

1. (2 points) Each limit below does not exist. Explain why, and provide your evidence. (Refer to the four ways that limits may fail to exist.)

(a) $\lim_{x \rightarrow 5} \left(\frac{x^2 + 7x}{x^2 - 25} \right)$

x	5.1	5.01	4.9	4.99
$\frac{x^2 + 7x}{x^2 - 25}$	61.099	601.0999	-58.899	-598.8999

FUNCTION VALUES

ARE GROWING

WITHOUT BOUND AND WHAT HAPPENS ON LEFT AND RIGHT IS DIFFERENT.

(b) $\lim_{x \rightarrow 0} \frac{x}{\ln x}$

$\frac{x}{\ln x}$ IS NOT DEFINED TO THE LEFT OF $x = 0$

2. (3 points) Suppose that $\lim_{x \rightarrow 2} f(x) = 9$ and $\lim_{x \rightarrow 2} g(x) = -3$. Determine each limit.

(a) $\lim_{x \rightarrow 2} [2f(x) - g(x)]$

$$= 2 \lim_{x \rightarrow 2} f(x) - \lim_{x \rightarrow 2} g(x) = 2(9) - (-3) = \boxed{21}$$

(b) $\lim_{x \rightarrow 2} \frac{f(x)}{2g(x)} = \frac{\lim_{x \rightarrow 2} f(x)}{2 \lim_{x \rightarrow 2} g(x)} = \frac{9}{2(-3)} = -\frac{9}{6} = \boxed{-\frac{3}{2}}$

(c) $\lim_{x \rightarrow 2} [(x^2 - 2x)f(x)g(x)] = \left[\left(\lim_{x \rightarrow 2} x \right)^2 - 2 \lim_{x \rightarrow 2} x \right] \left[\lim_{x \rightarrow 2} f(x) \right] \left[\lim_{x \rightarrow 2} g(x) \right]$

$$= (4 - 4)(9)(-3) = \boxed{0}$$