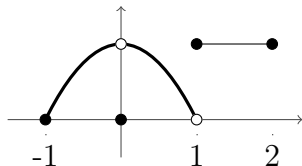


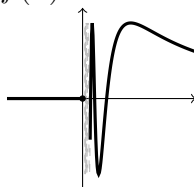
MA111 - Homework Sec. 2.4

You may work together but do not copy other peoples' work and present it as your own.

1 Which of the following statements are true about the function $y = f(x)$ graphed here are true, and which are false.



- a. $\lim_{x \rightarrow -1^+} f(x) = 0$ b. $\lim_{x \rightarrow 0^-} f(x) = 1$ c. $\lim_{x \rightarrow 0^-} f(x) = 0$
d. $\lim_{x \rightarrow 0^-} f(x) = \lim_{x \rightarrow 0^+} f(x)$ e. $\lim_{x \rightarrow 0} f(x)$ exists f. $\lim_{x \rightarrow 0} f(x) = 1$
g. $\lim_{x \rightarrow 0} f(x) = 0$ h. $\lim_{x \rightarrow 1} f(x) = 0$ i. $\lim_{x \rightarrow 1} f(x) = 1$
j. $\lim_{x \rightarrow 2^-} f(x) = 2$ k. $\lim_{x \rightarrow -1^-} f(x)$ does not exist l. $\lim_{x \rightarrow 2^+} f(x) = 1$

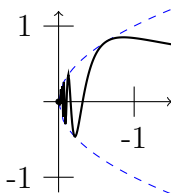


2 Let $f(x) = \begin{cases} 0 & x \leq 0 \\ \sin(1/x) & x \geq 0 \end{cases}$

Do the indicated limits exist? If so what is the value of the limit? If not, why not?

- a. $\lim_{x \rightarrow 0^+} f(x)$ b. $\lim_{x \rightarrow 0^-} f(x)$ c. $\lim_{x \rightarrow 0} f(x)$

3 Let $g(x) = \sqrt{x} \sin(1/x)$. Does the indicated limit exist? If so, what is it? If not, why not?



- a. $\lim_{x \rightarrow 0^+} g(x)$
b. $\lim_{x \rightarrow 0^-} g(x)$
c. $\lim_{x \rightarrow 0} g(x)$

4 $\lim_{x \rightarrow 0.5^-} \sqrt{\frac{x+2}{x+1}}$

5 $\lim_{x \rightarrow 2^-} \left(\frac{1}{x+2} \right) \left(\frac{x+6}{x} \right) \left(\frac{3-x}{7} \right)$

6 $\lim_{h \rightarrow 0^+} \frac{\sqrt{h^2 + 6h + 10} - \sqrt{10}}{h}$

7 a. $\lim_{x \rightarrow 2^-} \frac{\sqrt{3x(x-2)}}{|x-2|}$ b. $\lim_{x \rightarrow 2^+} \frac{\sqrt{3x(x-2)}}{|x-2|}$

For 8-11 you may use the fact that $\lim_{\theta \rightarrow 0} \frac{\sin(\theta)}{\theta} = 1$.

8 $\lim_{\theta \rightarrow 0} \frac{\sin(\sqrt{3}\theta)}{\sqrt{3}\theta}$

9 $\lim_{x \rightarrow 0} \frac{\tan(3x)}{x}$

10 $\lim_{x \rightarrow 0} \frac{x^2 - x + \sin(x)}{3x}$

11 $\lim_{y \rightarrow 0} \frac{\sin(3y) \cot(5y)}{y \cot(7y)}$

Answers and suggestions

1 True, True, False,
True, True, True,
False, False, False,
False, True, False

2 a. No b. Yes, 0 c. No

5 $1/7$

7 a. $-\sqrt{6}$ b. $\sqrt{6}$

9 3

11 4.2