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1. Estimate the given limit using a numerical approximation (15 pts)

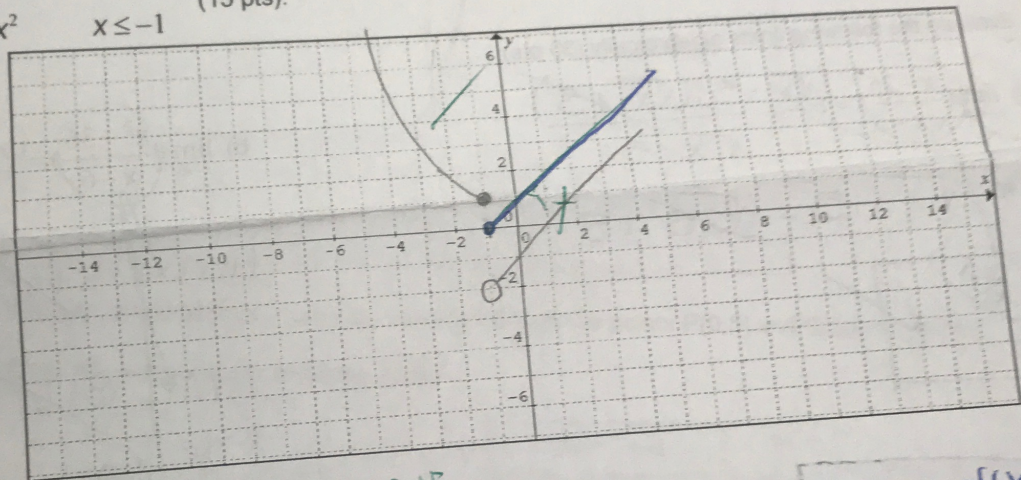
$$\lim_{x \rightarrow 0} \frac{\sqrt{x+1} - 1}{x}$$

x	-0.1	-0.01	-0.001	0	0.001	0.01	0.1
f(x)	0.513	0.5012	0.50012	/	0.4998	0.4987	0.4880

≈ 0.5

2. Graph the following functions and find their limits. (15 pts)

$$f(x) = \begin{cases} x+1 & x > -1 \\ x^2 & x \leq -1 \end{cases}$$



Find (20 pts)

a) $\lim_{x \rightarrow -1^+} f(x)$ 0

c) $\lim_{x \rightarrow -1} f(x)$ 1

b) $\lim_{x \rightarrow -1^-} f(x)$ 1

d) $f(-1)$ 1

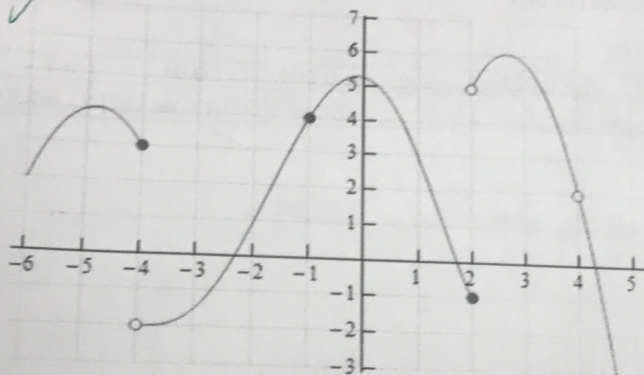
careful!
 $0 \leftarrow \lim_{x \rightarrow -1^+} f(x)$

$1 \leftarrow \lim_{x \rightarrow -1^-} f(x)$

-10

b) Use the results of part (a) to find an estimation of the slope of the tangent line to the

3. Based on the graph find the limits (20 pts)



a) $\lim_{x \rightarrow 4^-} f(x) = 2$ b) $\lim_{x \rightarrow 2^-} f(x) = 5$
 c) $\lim_{x \rightarrow 4} f(x) = 2$ d) $f(4) = 2$

4. Evaluate the following limits algebraically (30 pts):

Notation

a) $\lim_{x \rightarrow 25} \left(\frac{x-25}{\sqrt{x}-5} \right) = \frac{(\sqrt{x}-5)(\sqrt{x}+5)}{\sqrt{x}-5}$

$\lim_{x \rightarrow 25} \sqrt{x} + 5 = \sqrt{25} + 5$

$\lim_{x \rightarrow 25} 10$

$\lim_{x \rightarrow 25} f(x) = 10$

b) $\lim_{x \rightarrow 6} \left(\frac{x^2-36}{x-6} \right) = \frac{(x-6)(x+6)}{x-6}$

$\lim_{x \rightarrow 6} x+6$

$\lim_{x \rightarrow 6} 6+6$

$\lim_{x \rightarrow 6} 12$

$\lim_{x \rightarrow 6} f(x) = 12$