

You may use a calculator and your homework, but not your books or notes. There are three problems worth 8 points each. Show all of your work to receive full/partial credit.

- 1) Complete the table and use the result to estimate the limit.

$$\lim_{x \rightarrow -5} \frac{\sqrt{4-x}-3}{x+5}$$

x	-5.1	-5.01	-5.001	-4.999	-4.99	-4.9
$f(x)$	-0.1662	-0.1667	-0.1667	-0.1667	-0.1667	-0.1671

Based on the table, the limit is -0.1667

- 2) Find the limit (if it exists).

$$\lim_{x \rightarrow 3} \frac{\sqrt{x+1}-2}{x-3}$$

$$\lim_{x \rightarrow 3} \frac{(\sqrt{x+1}-2)(\sqrt{x+1}+2)}{(x-3)(\sqrt{x+1}+2)} = \lim_{x \rightarrow 3} \frac{x+1-4}{(x-3)(\sqrt{x+1}+2)}$$

$$= \lim_{x \rightarrow 3} \frac{\cancel{x-3}}{\cancel{(x-3)}(\sqrt{x+1}+2)} = \lim_{x \rightarrow 3} \frac{1}{\sqrt{x+1}+2} = \frac{1}{\sqrt{4}+2}$$

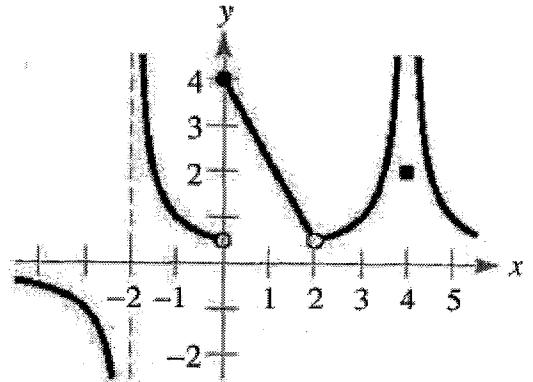
$$= \frac{1}{4}$$

- 3) (8 points) Use the graph of the function f to decide whether the value of the given quantity exists. If it does, find it. If not, explain why.

a) $f(-2)$ undefined, asymptote

b) $\lim_{x \rightarrow -2} f(x)$ DNE
asymptote

c) $f(0) = 4$



d) $\lim_{x \rightarrow 0} f(x)$ DNE

as $x \rightarrow 0$ from the left, y -values approach $\frac{1}{2}$
 as $x \rightarrow 0$ " " right, " " " 4 ∇ not the same

e) $f(2)$ undefined -
hole at $x=2$

f) $\lim_{x \rightarrow 2} f(x) = \frac{1}{2}$

g) $f(4) = 2$

h) $\lim_{x \rightarrow 4} f(x)$ DNE; y -values approach ∞ as $x \rightarrow 4$
 from either direction (vertical asymptote)