

Calculus 1 Worksheet #6

Limits approaching points from left or right: $\lim_{x \rightarrow a^-} f(x)$ or $\lim_{x \rightarrow a^+} f(x)$

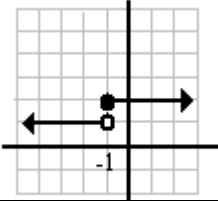
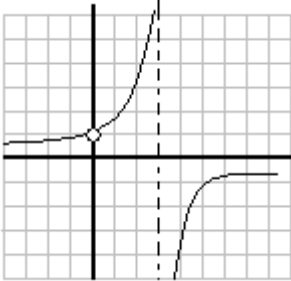
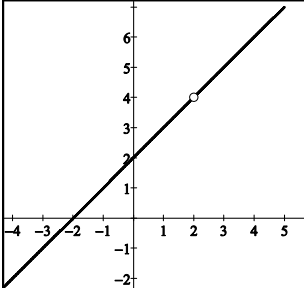
1. Sketch a graph of the function $f(x)$

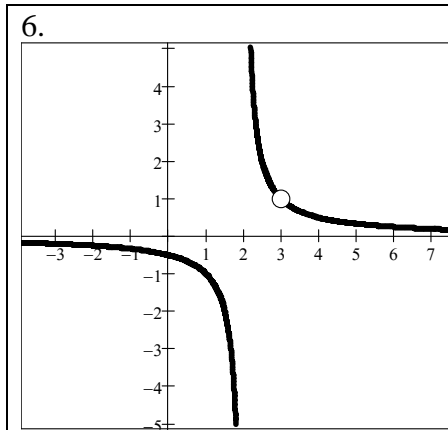
$$f(x) = \begin{cases} \frac{1}{x^2}, & x < -1 \\ 2, & -1 \leq x < 1 \\ 3, & x = 1 \\ x+1, & 1 < x \leq 2 \\ \frac{-1}{(x-2)^2}, & x > 2 \end{cases}$$

2. Using your graph from problem 1, determine the value of each of the following limits:

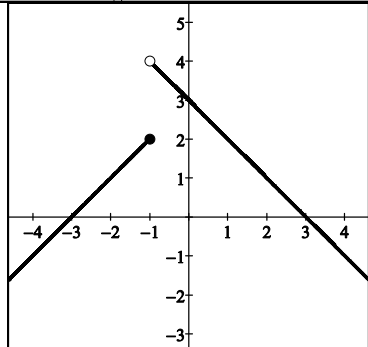
a. $\lim_{x \rightarrow -1^-} f(x) =$	b. $\lim_{x \rightarrow -1^+} f(x) =$	c. $\lim_{x \rightarrow -1} f(x) =$	d. $\lim_{x \rightarrow 1^-} f(x) =$	e. $\lim_{x \rightarrow 1^+} f(x) =$	f. $\lim_{x \rightarrow 1} f(x) =$
g. $\lim_{x \rightarrow 2^-} f(x) =$	h. $\lim_{x \rightarrow 2^+} f(x) =$	i. $\lim_{x \rightarrow 2} f(x) =$	j. $\lim_{x \rightarrow -3} f(x) =$	k. $\lim_{x \rightarrow 5} f(x) =$	l. $\lim_{x \rightarrow 1.5} f(x) =$

For problems 3–8, use the graph to test each function for continuity at the indicated value of x .

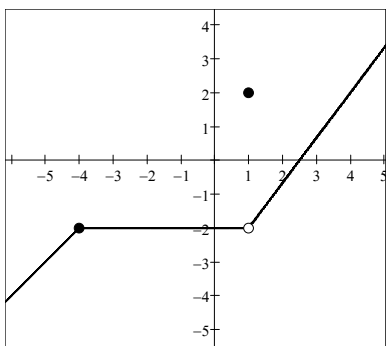
<p>3.</p> 	<p>3a) Is $f(x)$ continuous at $x = -1$? 3b) What kind(s) of discontinuity does $f(x)$ have? 3c) On what open interval(s) is $f(x)$ continuous?</p>
<p>4.</p> 	<p>4a) Is $f(x)$ continuous at $x = 3$? 4b) What kind(s) of discontinuity does $f(x)$ have? 4c) On what open interval(s) is $f(x)$ continuous?</p>
<p>5.</p> 	<p>5a) Is $f(x)$ continuous at $x = 2$? 5b) What kind(s) of discontinuity does $f(x)$ have? 5c) On what open interval(s) is $f(x)$ continuous? 5d) How would you remove the discontinuity?</p>



- 6a) Is $f(x)$ continuous at $x = 3$?
 6b) What kind(s) of discontinuity does $f(x)$ have?
 6c) On what open interval(s) is $f(x)$ continuous?



- 7a) Is $f(x)$ continuous at $x = -1$?
 7b) What kind(s) of discontinuity does $f(x)$ have?
 7c) On what open interval(s) is $f(x)$ continuous?



- 8a) Is $f(x)$ continuous at $x = 1$?
 8b) What kind(s) of discontinuity does $f(x)$ have?
 8c) On what open interval(s) is $f(x)$ continuous?
 8d) Define $f(x)$ as a piecewise function.

Find each one-sided limit:

9. $\lim_{x \rightarrow 2^+} \frac{x-3}{x-2} =$	10. $\lim_{x \rightarrow 0^-} \frac{ x }{x} =$	11. $\lim_{x \rightarrow 3^+} \frac{x-5}{x^2-9} =$	12. $\lim_{x \rightarrow \pi^-} \frac{\cos x}{x} =$	13. $\lim_{x \rightarrow 3^-} \frac{x^2 + 2x - 3}{x^2 + x - 6} =$
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