## LIMITS WORKSHEET #4

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

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

| 2. | Using your | graph from | problem 1 | . determine | the value of | of each of t | he following limits: |
|----|------------|------------|-----------|-------------|--------------|--------------|----------------------|
|    | - 0,       | 0          |           | ,           |              |              |                      |

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

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

| 3.  | <ul> <li>3a) Is f(x) continuous at x = -1? Why or why not?</li> <li>3b) What kind(s) of discontinuity does f(x) have?</li> <li>3c) On what open interval(s) is f(x) continuous?</li> </ul>  |
|---|---|
| 4.  | <ul> <li>4a) Is f(x) continuous at x = 3? Why or why not?</li> <li>4b) What kind(s) of discontinuity does f(x) have?</li> <li>4c) On what open interval(s) is f(x) continuous?</li> </ul>   |
| 5.<br>$ \begin{array}{c}             6^{-} \\             5^{-} \\             4^{-} \\             7^{-} \\             4^{-} \\             7^{-} \\             1^{-} \\             -1^{-} \\             -2^{-} \\             7^{-} \\             $ | <ul> <li>5a) Is f(x) continuous at. x = 2? Why or why not?</li> <li>5b) What kind(s) of discontinuity does f(x) have?</li> <li>5c) On what open interval(s) is f(x) continuous?</li> <li>5d) How would you remove the discontinuity?</li> </ul> |



## Find each one-sided limit:

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