Name _____ Date _____ Period _____

## 10.1 Limits–A Graphical Approach Homework

Problems 1 – 4, complete the table and use the result to estimate the limit. Graph the function and verify your result.

1. $\lim\limits_{x\to 3} \dfrac{x-3}{x^2+2x-15}$

| $x$ | 2.9 | 2.99 | 2.999 | 3.001 | 3.01 | 3.1 |
|---|---|---|---|---|---|---|
| $f(x)$ | | | | | | |

2. $\lim\limits_{x\to 0} \dfrac{\sin x}{x}$

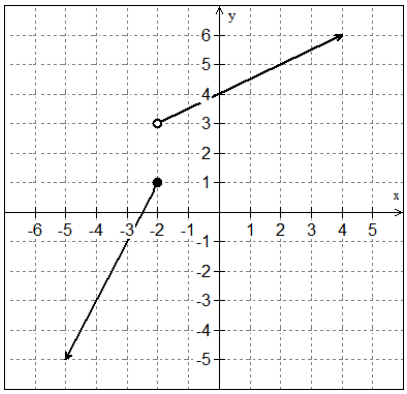
| $x$ | −0.1 | −0.01 | −0.001 | 0.001 | 0.01 | 0.1 |
|---|---|---|---|---|---|---|
| $f(x)$ | | | | | | |

3. $\lim\limits_{x\to 4} \dfrac{x^2-16}{x-4}$

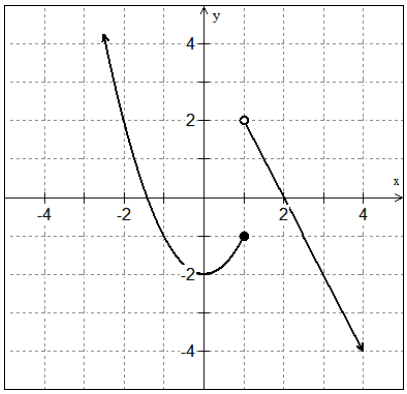
| $x$ | 3.9 | 3.99 | 3.999 | 4.001 | 4.01 | 4.1 |
|---|---|---|---|---|---|---|
| $f(x)$ | | | | | | |

Problems 5 – 8, use the graph to find the limit (if it exists). If the limit does not exist, explain why.

5.

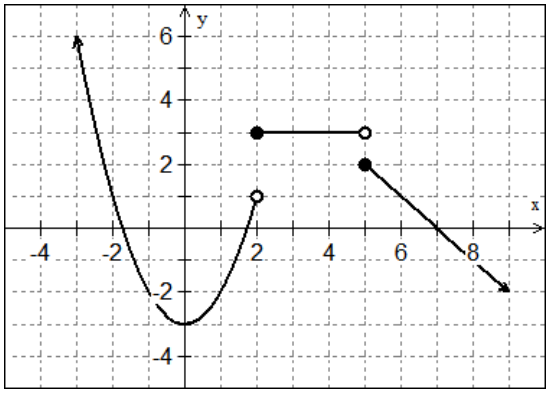



6.

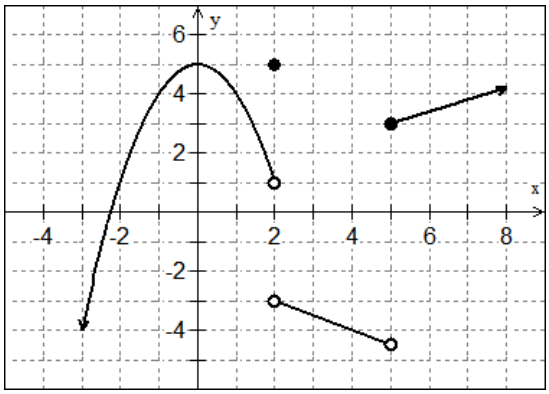



| | | | |
|---|---|---|---|
| A. $\lim\limits_{x\to 0} f(x)$ | B. $\lim\limits_{x\to -4} f(x)$ | A. $\lim\limits_{x\to -2} f(x)$ | B. $\lim\limits_{x\to 0} f(x)$ |
| C. $\lim\limits_{x\to -2^-} f(x)$ | D. $\lim\limits_{x\to -2^+} f(x)$ | C. $f(1)$ | D. $\lim\limits_{x\to 2} f(x)$ |
| E. $f(-2)$ | F. $\lim\limits_{x\to -2} f(x)$ | E. $\lim\limits_{x\to 1} f(x)$ | F. $\lim\limits_{x\to -\infty} f(x)$ |

7.



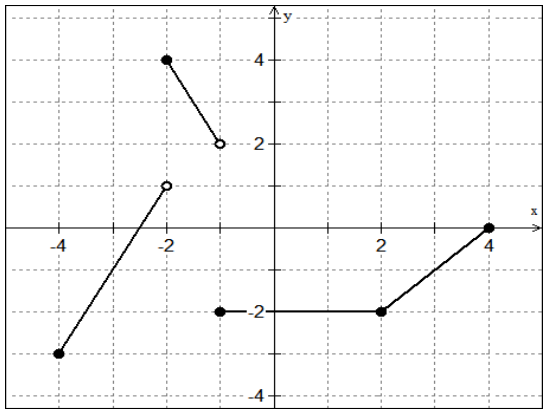

8.



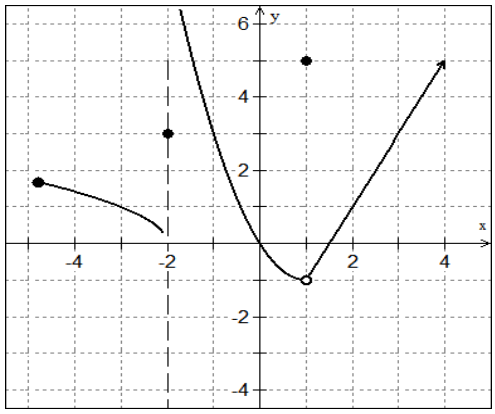

| | | | |
|---|---|---|---|
| A. $\lim_{x\to 0} f(x)$ | B. $\lim_{x\to 2^-} f(x)$ | A. $\lim_{x\to 5^-} f(x)$ | B. $\lim_{x\to 2} f(x)$ |
| C. $\lim_{x\to 4} f(x)$ | D. $\lim_{x\to 5} f(x)$ | C. $\lim_{x\to 0} f(x)$ | D. $\lim_{x\to \infty} f(x)$ |
| E. $\lim_{x\to -\infty} f(x)$ | F. $\lim_{x\to 7} f(x)$ | E. $\lim_{x\to 4} f(x)$ | F. $\lim_{x\to 2^+} f(x)$ |

Problems 9 – 10, Use the graph to decide whether the value of the given quantity exists. If it does, find it. If not, explain why.

9.



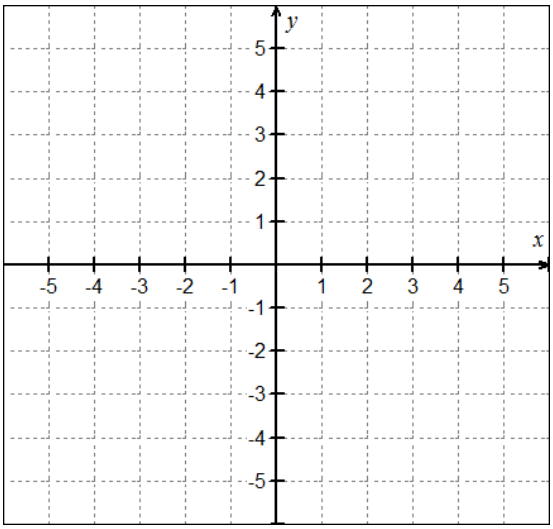

10.




| | | | |
|---|---|---|---|
| A. $f(-1)$ | B. $\lim_{x\to -1} f(x)$ | A. $f(1)$ | B. $\lim_{x\to -2} f(x)$ |
| C. $\lim_{x\to 4} f(x)$ | D. $\lim_{x\to -2^-} f(x)$ | C. $\lim_{x\to -2^+} f(x)$ | D. $\lim_{x\to 1} f(x)$ |

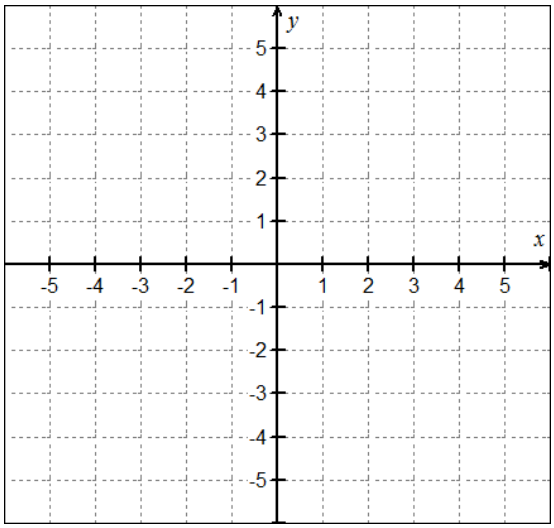
Problems 11 – 12, sketch a graph of a function that fits the requirements described below.

11. $\lim_{x\to 2^-} f(x) = 3$ $\lim_{x\to 2^+} f(x) = -2$ $f(2) = 1$

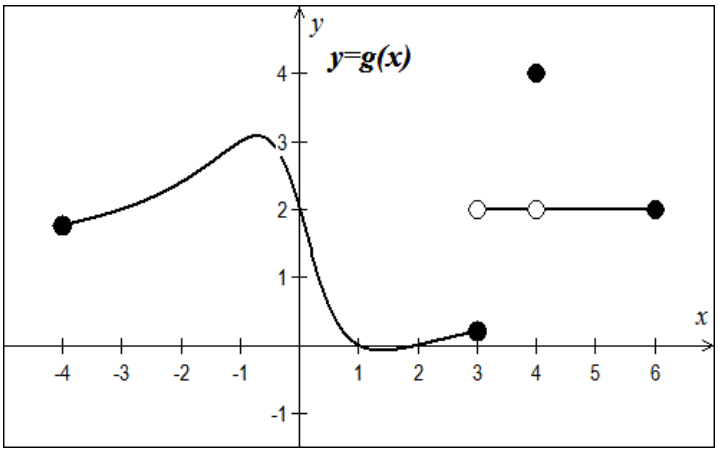



12. $\lim_{x\to -2^-} f(x) = -\infty$ $\lim_{x\to -2^+} f(x) = \infty$

$f(2)$ is undefined but the limit exists




Problems 13 – 15, use the graph of the function, $g(x)$, below, to determine if the statements are true or false. For statements that are false, explain why.




13. $\lim_{x\to 3} g(x) \approx 0.2$

14. $\lim_{x\to 4} g(x)$ does not exist.

15. $\lim_{x\to c} g(x)$ exists for every value of $c$ on the interval $-4 < x < 3$



*Jean Adams*