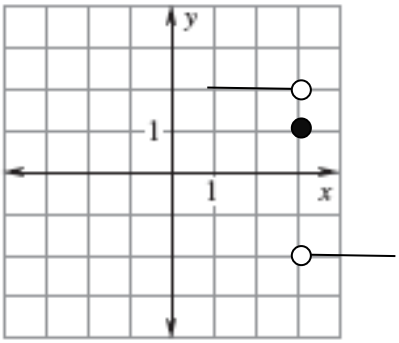
Honors Pre-Calculus **Limits Worksheet #5** **Name**_____
May 2014

Use the graph to estimate the limits and function values, or explain why the limits do not exist or the function values are undefined.

1.



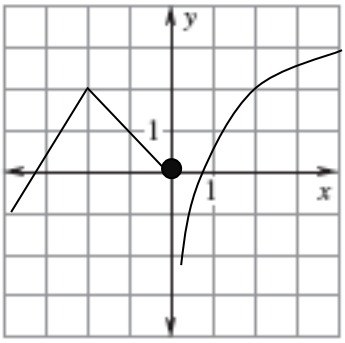
a. $\lim_{x \to 3^-} =$ _____

b. $\lim_{x \to 3^+} =$ _____

c. $\lim_{x \to 3} =$ _____

d. $f(3) =$ _____

2.



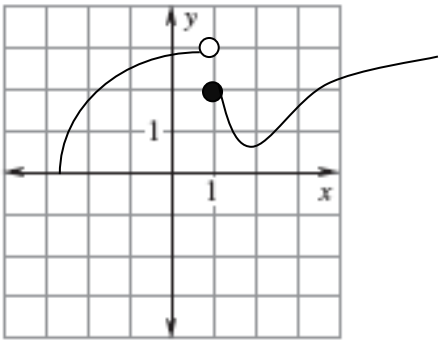
a. $\lim_{x \to -2^-} =$ _____

b. $\lim_{x \to -2^+} =$ _____

c. $\lim_{x \to -2} =$ _____

d. $f(-2) =$ _____

3.



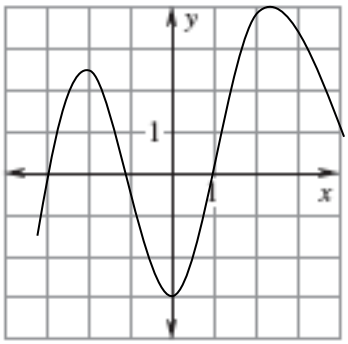
a. $\lim_{x \to 1^-} =$ _____

b. $\lim_{x \to 1^+} =$ _____

c. $\lim_{x \to 1} =$ _____

d. $f(1) =$ _____

4.



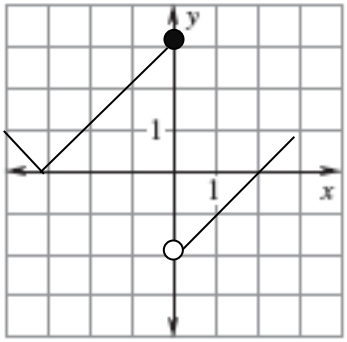
b. $\lim_{x \to 0^-} =$ _____

c. $\lim_{x \to 0^+} =$ _____

d. $\lim_{x \to 0} =$ _____

e. $f(0) =$ _____

5.



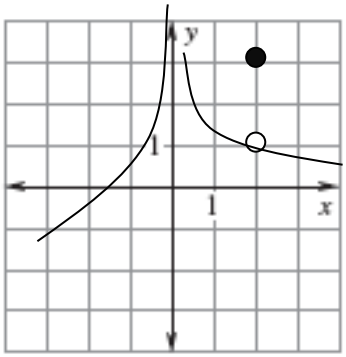
a. $\lim_{x \to 0^-} =$ _____

b. $\lim_{x \to 0^+} =$ _____

c. $\lim_{x \to 0} =$ _____

d. $f(0) =$ _____

6.



a. $\lim_{x \to 2^-} =$ _____

b. $\lim_{x \to 2^+} =$ _____

c. $\lim_{x \to 2} =$ _____

d. $f(2) =$ _____

Determine the limit.

7. $\lim_{x \to -\frac{1}{2}} 3x^2(2x-1)$

8. $\lim_{x \to -4} (x+3)^{1997}$

9. $\lim_{x \to -3} \frac{x^2+4x+3}{x^2-3}$

10. $\lim_{x \to 0} e^x \cos x$

11. $\lim_{x \to -2} \sqrt{x-2}$

12. $\lim_{x \to 0} \frac{1}{x^2}$

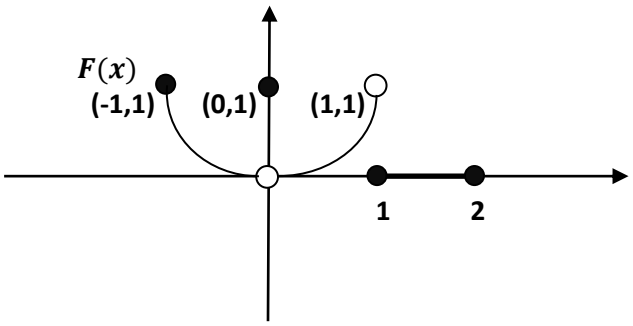
13. $\lim_{x \to 1} \frac{x-1}{x^2-1}$

14. $\lim_{x \to 2} \frac{x^2-3x+2}{x^2-4}$

15. $\lim_{x \to 0} \frac{(2+x)^3-8}{x}$

16. $\lim_{x \to 0} \frac{\sin 2x}{x}$ *hint: graph this one!

17.



a. $\lim_{x \to 0^-} f(x) =$ _____

b. $\lim_{x \to 0^+} f(x) =$ _____

c. $\lim_{x \to 0} f(x) =$ _____

d. $\lim_{x \to 1^-} f(x) =$ _____

e. $\lim_{x \to 1^+} f(x) =$ _____

f. $\lim_{x \to 1} f(x) =$ _____

g. $\lim_{x \to 2^-} f(x) =$ _____

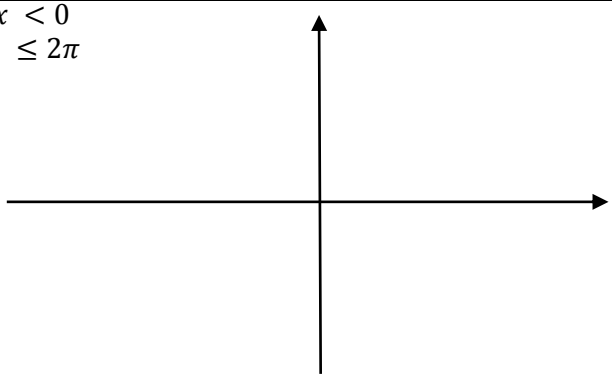
h. $\lim_{x \to 2^+} f(x) =$ _____

i. $\lim_{x \to 2} f(x) =$ _____

j. $f(0) =$ _____

k. On the interval $[-1,1]$, f(x) is discontinuous at x = _____

18. Given the piecewise function $f(x) = \begin{cases} \sin x, & -2\pi \leq x < 0 \\ \cos x, & 0 \leq x \leq 2\pi \end{cases}$



a. Draw the graph

b. At what points does ***only*** the left hand limit exist?

c. At what point does ***only*** the right hand limit exist?

19. $\lim_{x \to 0} \dfrac{\frac{1}{x+2} - \frac{1}{2}}{x}$

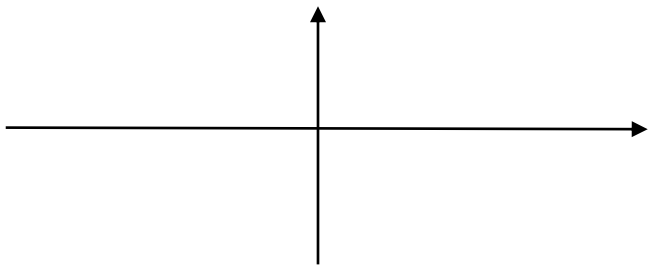
20. $\lim_{x \to \infty} \; 2\cos\left(\frac{1}{x}\right) + 1$

21. $\lim_{x \to \infty} \dfrac{e^{-x}}{x}$

22. $\lim_{x \to 0^+} \; \csc x$

23. Sketch a possible graph for a function $f(x)$ that has the stated properties.

$f(4)$ exists (is defined), $\lim_{x \to 4} f(x)$ exists, but $f(x)$ is **not** continuous at $x = 4$



Answers:

1a. 2 **1b**. -2 **1c**. does not exist **1d**. 1

2a. 2 **2b**. 2 **2c**. 2 **2d**. 2

3a. 3 **3b**. 2 **3c**. does not exist **3d**. 2

4a. -3 **4b**. -3 **4c**. -3 **4d**. -3

5a. 3 **5b**. -2 **5c**. does not exist **5d**. 3

6a. 1 **6b**. 1 **6c**. 1 **6d**. 3

7. $-\frac{3}{2}$ **8**. -1 **9**. 0 **10**. 1

11. does not exist **12**. does not exist **13**. $\frac{1}{2}$ **14**. $\frac{1}{4}$

15. 12 **16**. 2 **17a**. 0 **17b**. 0

17c. 0 **17d**. 1 **17e**. 0 **17f**. does not exist

17g. 0 **17h**. does not exist **17i**. does not exist **17j**. 1

17k. $x = 0, 1$ **18b**. 2π **18c**. -2π **19**. $-\frac{1}{4}$

20. 3 **21**. 0 **22**. ∞ **23**. answers will vary