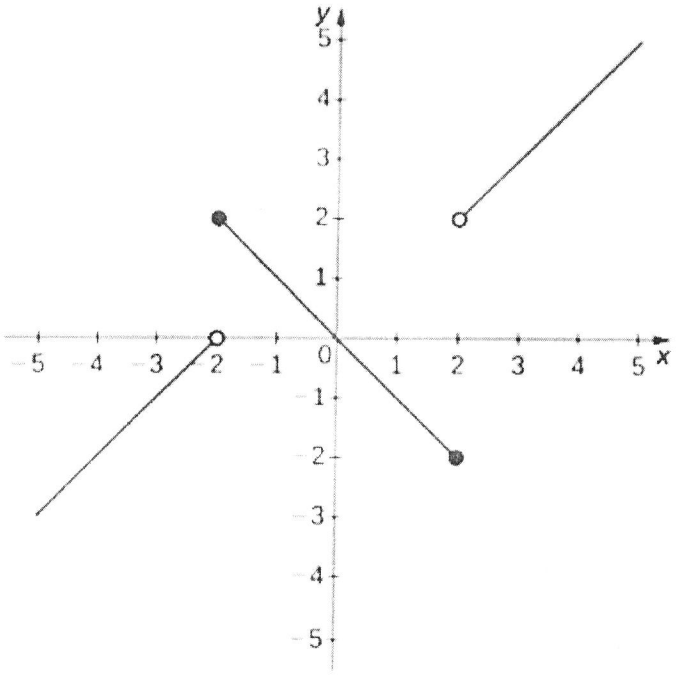
Calculus Lesson 133 One Sided Limits

One Sided Limits

If you only want to know what y-value a function approaches as the x-value moves toward 3 (or any other value) from the LEFT, you will see $\lim_{x \to 3^-} f(x) =$

If you only want to know what y-value a function approaches as the x-value moves toward 3 (or any other value) from the RIGHT, you will see $\lim_{x \to 3^+} f(x) =$



59. $\lim_{x \to -2^-} f(x)$

60. $\lim_{x \to -2^+} f(x)$

61. $\lim_{x \to -2} f(x)$

62. $\lim_{x \to 2^-} f(x)$

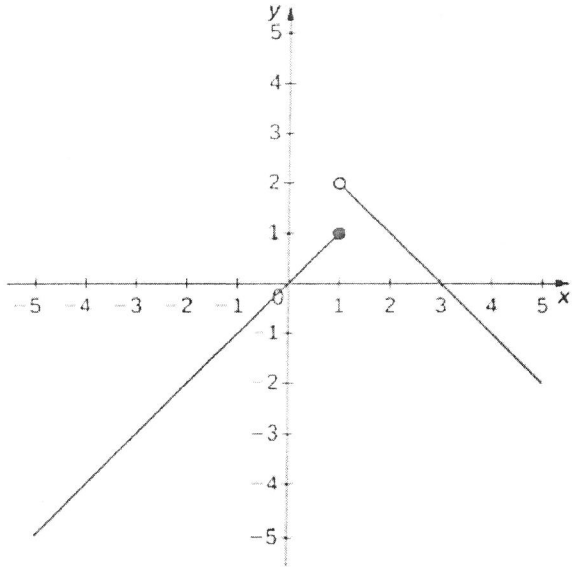
63. $\lim_{x \to 2^+} f(x)$

64. $\lim_{x \to 2} f(x)$

HW: complete worksheet 133

Calculus Worksheet 133 Name_____ Pd_____

In the following exercises, use the following graph of the function $y = f(x)$ to find the values, if possible. Estimate when necessary.



50. $\lim_{x \to 1^-} f(x)$

51. $\lim_{x \to 1^+} f(x)$

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

53. $\lim_{x \to 2} f(x)$

54. $f(1)$

In Exercises 7–24, find the limit (if it exists). If it does not exist, explain why.

7. $\lim_{x \to 5^+} \dfrac{x-5}{x^2-25}$

8. $\lim_{x \to 2^+} \dfrac{2-x}{x^2-4}$

9. $\lim_{x \to -3^-} \dfrac{x}{\sqrt{x^2-9}}$

10. $\lim_{x \to 4^+} \dfrac{\sqrt{x}-2}{x-4}$

11. $\lim_{x \to 0} \dfrac{|x|}{x}$

12. $\lim_{x \to 2^+} \dfrac{|x-2|}{x-2}$

13. $\lim_{\Delta x \to 0^-} \dfrac{\dfrac{1}{x+\Delta x} - \dfrac{1}{x}}{\Delta x}$

14. $\lim_{\Delta x \to 0^+} \dfrac{(x+\Delta x)^2 + x + \Delta x - (x^2+x)}{\Delta x}$

103. $\lim_{x \to -2^-} \dfrac{2x^2+7x-4}{x^2+x-2}$

104. $\lim_{x \to -2^+} \dfrac{2x^2+7x-4}{x^2+x-2}$

105. $\lim_{x \to 1^-} \dfrac{2x^2+7x-4}{x^2+x-2}$

106. $\lim_{x \to 1^+} \dfrac{2x^2+7x-4}{x^2+x-2}$

Review:

15. If $f(x) = \dfrac{x^2 + 5x - 24}{x^2 + 10x + 16}$, then $\lim_{x \to -8} f(x)$ is

(A) 0 (B) 1 (C) $-\frac{3}{2}$ (D) $\frac{11}{6}$ (E) Nonexistent

24. $\lim_{x \to 0} \dfrac{\tan(3x) + 3x}{\sin(5x)} =$

(A) 0 (B) $\frac{3}{5}$ (C) 1 (D) $\frac{6}{5}$ (E) Nonexistent

C
31. $\lim_{h \to 0} \dfrac{\tan\left(\frac{\pi}{6} + h\right) - \tan\left(\frac{\pi}{6}\right)}{h} =$

(A) $\frac{\sqrt{3}}{3}$ (B) $\frac{4}{3}$ (C) $\sqrt{3}$ (D) 0 (E) $\frac{3}{4}$

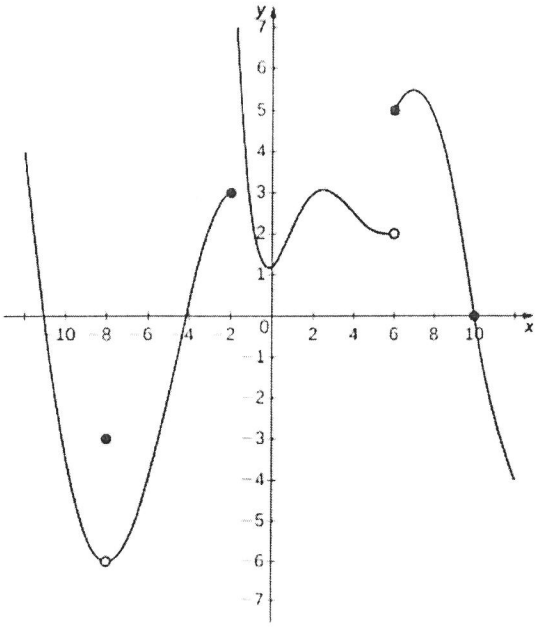
For the following exercises, consider the function $f(x) = (1 + x)^{1/x}$.

32. [T] Make a table showing the values of f for $x = -0.01, -0.001, -0.0001, -0.00001$ and for $x = 0.01, 0.001, 0.0001, 0.00001$. Round your solutions to five decimal places.

x	$f(x)$	x	$f(x)$
−0.01	a.	0.01	e.
−0.001	b.	0.001	f.
−0.0001	c.	0.0001	g.
−0.00001	d.	0.00001	h.

33. What does the table of values in the preceding exercise indicate about the function $f(x) = (1 + x)^{1/x}$?

34. To which mathematical constant does the limit in the preceding exercise appear to be getting closer?



46. $\lim_{x \to 10} f(x) = 0$

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

48. $\lim_{x \to -8} f(x) = f(-8)$

49. $\lim_{x \to 6} f(x) = 5$