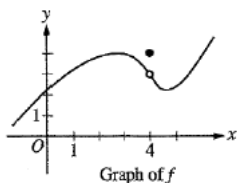


Limits Practice ... Set 2

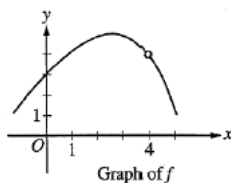
Limits Practice Test

1. For which of the following does $\lim_{x \rightarrow 4} f(x)$ exist?

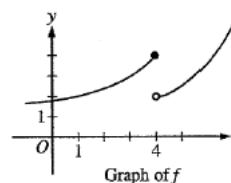
i.



ii.



iii.



- a. I only b. II only c. III only d. I and II only e. I, II, III

2. Use the table of values to evaluate the limit.

x	-0.3	-0.2	-0.1	0	0.1	0.2	0.3
f(x)	7.018	7.008	7.002	20	7.002	7.008	7.018
g(x)	4.126	4.789	4.989	8	8.0015	8.1016	8.546
h(x)	4971	8987	9972	undefined	8.997	8.987	8.971

$$\lim_{x \rightarrow 0^+} f(x)$$

$$\lim_{x \rightarrow 0^-} f(x)$$

$$\lim_{x \rightarrow 0} f(x)$$

$$\lim_{x \rightarrow 0^+} g(x)$$

$$\lim_{x \rightarrow 0^-} g(x)$$

$$\lim_{x \rightarrow 0} g(x)$$

$$\lim_{x \rightarrow 0^+} h(x)$$

$$\lim_{x \rightarrow 0^-} h(x)$$

$$\lim_{x \rightarrow 0} h(x)$$

3. Find $\lim_{x \rightarrow \infty} \frac{-4x + 2x^3}{8x^3 + 4x^2 - 3}$.

- a. $\frac{1}{4}$ b. $-\frac{1}{4}$ c. $-\frac{1}{2}$ d. 0 e. ∞

4. Find $\lim_{x \rightarrow \infty} \frac{e^x + 5}{3 - 2e^x}$.

- a. $\frac{5}{3}$ b. $\frac{1}{3}$ c. $\frac{1}{2}$ d. $-\frac{1}{2}$ e. ∞

5. The graph of which function has $y = 2$ as an asymptote?

- a. $y = e^{-x} + 2$ b. $y = \ln(x - 2)$ c. $y = -\frac{2x^2}{4+x^2}$ d. $y = -\frac{2}{1-x}$ e. $y = \frac{4x}{2+x}$

6. State all the vertical and horizontal asymptotes and **justify your answer**.

$$f(x) = \frac{2x^2 - 50}{x^2 + 7x + 10}$$

Limits Practice ... Set 2

7. Find the indicated limits from the graph below.

a. $\lim_{x \rightarrow -1^-} f(x) =$

b. $\lim_{x \rightarrow -1^+} f(x) =$

c. $\lim_{x \rightarrow -1} f(x) =$

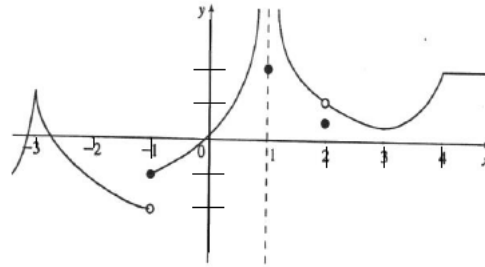
d. $\lim_{x \rightarrow 0} f(x) =$

e. $\lim_{x \rightarrow 1} f(x) =$

f. $\lim_{x \rightarrow 2} f(x) =$

g. $\lim_{x \rightarrow 4} f(x) =$

h. $\lim_{x \rightarrow 3^-} f(x) =$



8. Draw a graph of $g(x)$ that has the following conditions.

$\lim_{x \rightarrow \infty} g(x) = -\infty$

$\lim_{x \rightarrow -1} g(x) = -\infty$

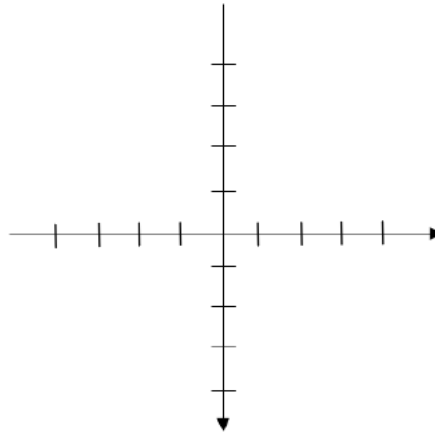
$\lim_{x \rightarrow 1^+} g(x) = 1$

$\lim_{x \rightarrow -2} g(x) = 3$

$\lim_{x \rightarrow 1^-} g(x) = 0$

$\lim_{x \rightarrow -\infty} g(x) = 1$

$g(1) = 0$



9. Draw an example of a function where a limit exists at a point but the function is still discontinuous at that point. Explain.

10. Draw the graph of an example of each of the following discontinuities. (Bonus for giving the equation of such a graph. The equation does not have to match the graph you draw.)

a. An infinite discontinuity

b. A jump discontinuity

Limits Practice ... Set 2

Find the limit if it exists.

11. $\lim_{x \rightarrow 5^-} \frac{4x-20}{|x-5|}$

12. $\lim_{t \rightarrow 2^+} \frac{1-\sqrt{3-t}}{t-2}$

13. $\lim_{x \rightarrow -\infty} e^{-x}$

14. $\lim_{x \rightarrow -\infty} \frac{5-2x^2}{x+2}$

15. $\lim_{x \rightarrow -2^-} \frac{-3}{2+x}$

16. $\lim_{x \rightarrow 0} (\sec x)$

17. $\lim_{x \rightarrow 0^+} \ln x$

18. $\lim_{x \rightarrow 0} \frac{\frac{2}{x+3} - \frac{2}{3}}{x}$

19. $\lim_{x \rightarrow \infty} \frac{\sqrt{4x^2-4x+2}}{5x-3}$

20. $\lim_{x \rightarrow \infty} \frac{8x^3-2x}{3x^2-5x^3}$

Limits Practice ... Set 2

21. Is the function continuous? **Justify your answer.**

$$f(x) = \begin{cases} x^2 - 1 & x > 2 \\ 3 & x = 2 \\ 4x - 3 & x < 2 \end{cases}$$

22. Find the value of a and b that make the function continuous

$$f(x) = \begin{cases} ax^2 - b & \text{if } x \leq -1 \\ 2bx + 5 & \text{if } -1 < x < 2 \\ bx^2 + ax + 1 & \text{if } x \geq 2 \end{cases}$$

23. Given $f(x) = \frac{2x^2 + 5x - 3}{x^2 - x - 12}$, complete the chart below.

f(x) is discontinuous at x =	Type of discontinuity

Can $f(x)$ be made continuous at any of the x values above? If so, at which x value and what point would you use to "repair" the discontinuity?

24. Verify the conditions of the Intermediate Value Theorem and find the guaranteed value of c in $(-3, 3)$ when $f(x) = x^2 - 3x - 4$, and $f(c) = 6$.