

Unit #5: Limits**Topic: Limits Review Sheet**

Objective: SWBAT find limits of various functions graphically, algebraically, and analytically.

NO CALCULATOR

Directions: Read each question carefully and show all work!

Part I:**Practice Problems**

Compute each of the following limits.

1. $\lim_{x \rightarrow 8^-} \frac{1}{\sqrt{x+1}-3}$

7. $\lim_{x \rightarrow 3} \frac{x^2 + 3x}{9 - x^2}$

12. $\lim_{x \rightarrow 4^-} \frac{\sqrt{x}-2}{x-4}$

2. $\lim_{x \rightarrow 8^+} \frac{1}{\sqrt{x+1}-3}$

8. $\lim_{x \rightarrow -3^-} \frac{x^2 + 3x}{9 - x^2}$

13. $\lim_{x \rightarrow 3^+} \frac{\sqrt{x+1}-2}{3-x}$

3. $\lim_{x \rightarrow 8} \frac{1}{\sqrt{x+1}-3}$

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

14. $\lim_{x \rightarrow 3^-} \frac{\sqrt{x+1}-2}{3-x}$

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

10. $\lim_{x \rightarrow -3^+} \frac{x^2 + 3x}{9 - x^2}$

15. $\lim_{x \rightarrow 15^+} \frac{1}{\sqrt{x-15}}$

5. $\lim_{x \rightarrow 3^-} \frac{x^2 + 3x}{9 - x^2}$

11. $\lim_{x \rightarrow 4^+} \frac{\frac{1}{x} - \frac{1}{4}}{x^2 - 16}$

16. $\lim_{x \rightarrow 15^-} \frac{1}{\sqrt{x-15}}$

6. $\lim_{x \rightarrow 3^+} \frac{x^2 + 3x}{9 - x^2}$

17. Determine the limits of the function based on its graph shown.

a) $\lim_{x \rightarrow 3^-} f(x)$

c) $\lim_{x \rightarrow 3} f(x)$

e) $\lim_{x \rightarrow 6^-} f(x)$

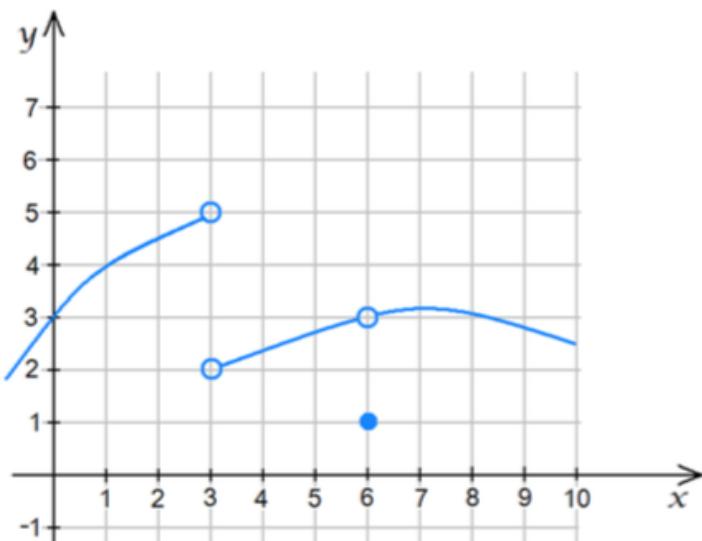
g) $\lim_{x \rightarrow 6} f(x)$

b) $\lim_{x \rightarrow 3^+} f(x)$

d) $f(3)$

f) $\lim_{x \rightarrow 6^+} f(x)$

h) $f(6)$



18. Determine each of the following based on the picture shown.

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

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

e) $\lim_{x \rightarrow 7^-} f(x)$

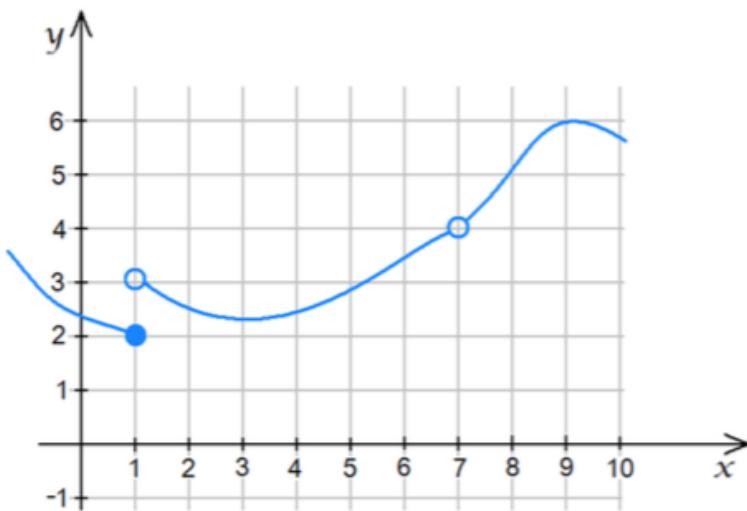
g) $\lim_{x \rightarrow 7} f(x)$

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

d) $f(1)$

f) $\lim_{x \rightarrow 7^+} f(x)$

h) $f(7)$



19. Determine each of the following based on the picture shown.

a) $\lim_{x \rightarrow -5^-} f(x)$

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

i) $\lim_{x \rightarrow 1^-} f(x)$

m) $\lim_{x \rightarrow 2^-} f(x)$

b) $\lim_{x \rightarrow -5^+} f(x)$

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

j) $\lim_{x \rightarrow 1^+} f(x)$

n) $\lim_{x \rightarrow 2^+} f(x)$

c) $\lim_{x \rightarrow -5} f(x)$

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

k) $\lim_{x \rightarrow 1} f(x)$

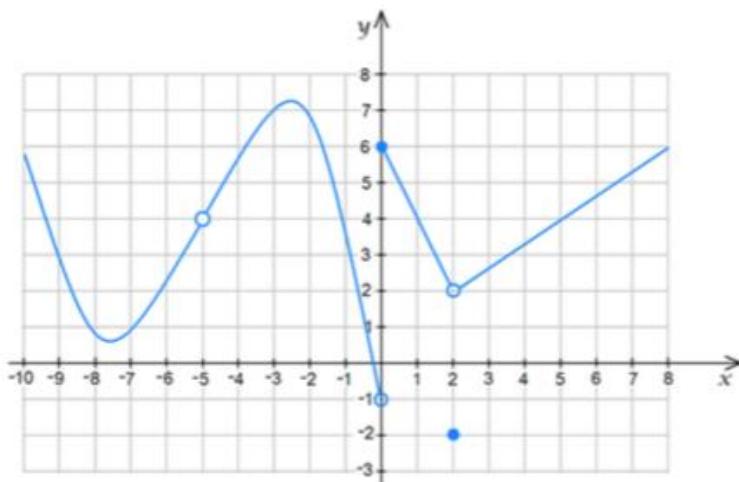
o) $\lim_{x \rightarrow 2} f(x)$

d) $f(-5)$

h) $f(0)$

l) $f(1)$

p) $f(2)$



20. Determine each of the following based on the picture shown.

a) $\lim_{x \rightarrow -2^-} f(x)$

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

i) $\lim_{x \rightarrow 2^-} f(x)$

m) $\lim_{x \rightarrow 5^-} f(x)$

q) $\lim_{x \rightarrow 7^-} f(x)$

b) $\lim_{x \rightarrow -2^+} f(x)$

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

j) $\lim_{x \rightarrow 2^+} f(x)$

n) $\lim_{x \rightarrow 5^+} f(x)$

r) $\lim_{x \rightarrow 7^+} f(x)$

c) $\lim_{x \rightarrow -2} f(x)$

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

k) $\lim_{x \rightarrow 2} f(x)$

o) $\lim_{x \rightarrow 5} f(x)$

s) $\lim_{x \rightarrow 7} f(x)$

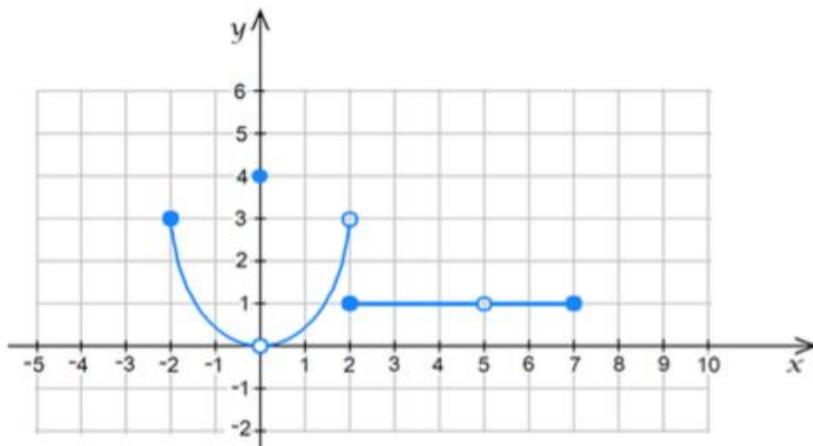
d) $f(-2)$

h) $f(0)$

l) $f(2)$

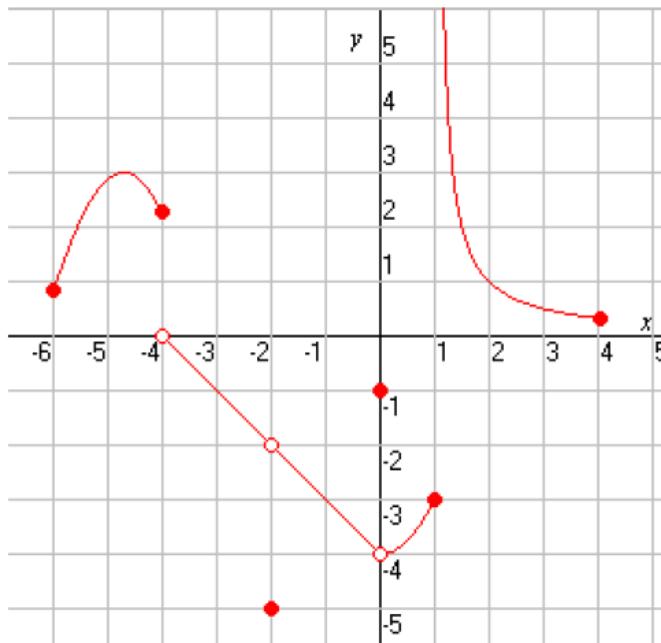
p) $f(5)$

t) $f(7)$



Part II:

21) Find each of the following values using the graph below.



(a) $\lim_{x \rightarrow -4^-} f(x)$

(b) $\lim_{x \rightarrow -2} f(x)$

(c) $f(-2)$

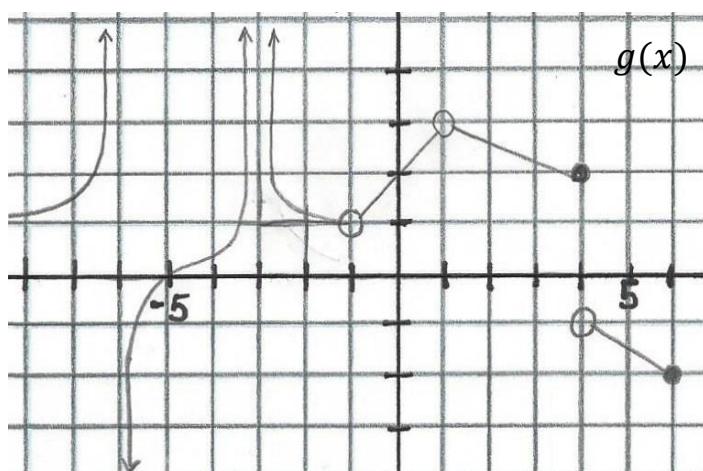
(d) $\lim_{x \rightarrow 1^-} f(x)$

(e) $\lim_{x \rightarrow 1^+} f(x)$

(f) $\lim_{x \rightarrow 1} f(x)$

(g) $f(1)$

(h) $\lim_{x \rightarrow 2} f(x)$



(i) $\lim_{x \rightarrow -6^+} g(x)$

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

(k) $\lim_{x \rightarrow 1} g(x)$

(l) $\lim_{x \rightarrow 4} g(x)$

(m) $g(1)$

(n) $g(4)$

Evaluate each of the following limits.

$$22) \lim_{x \rightarrow 1} \frac{(x^2 - 4x)^3}{x - 4} =$$

$$23) \lim_{x \rightarrow 5} \frac{x^2 + 4x - 45}{25 - x^2} =$$

$$24) \lim_{x \rightarrow -2} \frac{x^2 - 4}{x^3 + 2x^2 + x + 2} =$$

$$25) \lim_{x \rightarrow \infty} \left(\frac{1}{2} + \frac{5}{x^3} \right) =$$

$$26) \lim_{x \rightarrow -1} \frac{x + x^2}{x^2 - 1} =$$

$$27) \lim_{x \rightarrow 5} \frac{\frac{2}{x+3} - \frac{1}{4}}{x - 5} =$$

$$28) \lim_{x \rightarrow -2} \frac{\sqrt{2x + 5} - 1}{x + 2} =$$

$$29) \lim_{h \rightarrow 0} \frac{(2h-5)^2 - 25}{2h} =$$

30) $\lim_{x \rightarrow \infty} \frac{7x^3 - 3x^2 + 3x}{7 - 2x - x^3} =$

31) $\lim_{x \rightarrow -\infty} \frac{5x^3 + 4x^2}{x - 5x^2} =$

32) $\lim_{x \rightarrow 1} \frac{2x}{x - 1} =$

33) $\lim_{x \rightarrow 0} \frac{\sin 3x}{2x} =$

34) $\lim_{x \rightarrow 0} \frac{1 - \cos x}{5x} =$

35) $\lim_{x \rightarrow 0} \frac{4x + \sin 2x}{x} =$

36) $\lim_{x \rightarrow 0} \frac{\frac{1}{x+8} - \frac{1}{8}}{x} =$

37) $\lim_{x \rightarrow 2} \frac{\sqrt{x-1} - 1}{x - 2} =$

Given $\lim_{x \rightarrow c} f(x) = -\frac{1}{2}$ and $\lim_{x \rightarrow c} g(x) = \frac{4}{3}$, find

38) $\lim_{x \rightarrow c} [4f(x) - 6g(x)] =$

39) $\lim_{x \rightarrow c} [-3f(x)g(x)] =$

40) $\lim_{x \rightarrow c} [9g(x) + 2] =$

41) $\lim_{x \rightarrow c} \frac{f(x)}{g(x) + 1} =$

42) Given the function $f(x) = \begin{cases} -x + 1 & \text{for } x < -1 \\ 2 & \text{for } -1 < x < 3 \\ (x - 2)^2 - 3 & \text{for } x \geq 3 \end{cases}$

a) Graph $f(x)$ on the axes provided.

b) Find

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

$$\lim_{x \rightarrow 3} f(x) =$$

$$f(-1) =$$

$$f(3) =$$

