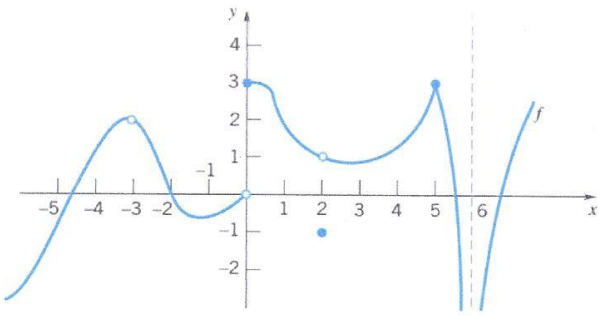
**Evaluating Limits – Graphically**




Given the graph above evaluate each of the following, if possible.

1. $f(5)$ — 3
2. $\lim_{x \to 5^-} f(x)$ — 3
3. $\lim_{x \to 5^+} f(x)$ — 3
4. $\lim_{x \to 5} f(x)$ — 3
5. $f(-3)$ — $\emptyset$
6. $\lim_{x \to -3^-} f(x)$ — 2
7. $\lim_{x \to -3^+} f(x)$ — 2
8. $\lim_{x \to -3} f(x)$ — 2
9. $f(2)$ — -1
10. $\lim_{x \to 2^-} f(x)$ — 1
11. $\lim_{x \to 2^+} f(x)$ — 1
12. $\lim_{x \to 2} f(x)$ — 1

13. What do you notice about the function and the limit when $x = 5$ ? Why?

$f(5) = \lim_{x \to 5} f(x)$ $f(x)$ IS CONTINUOUS at $x = 5$

10. What do you notice about the function and the limit when $x = -3$ ? Why?

$f(-3) \neq \lim_{x \to -3} f(x)$ $f(x)$ IS NOT CONTINUOUS AT $x = -3$

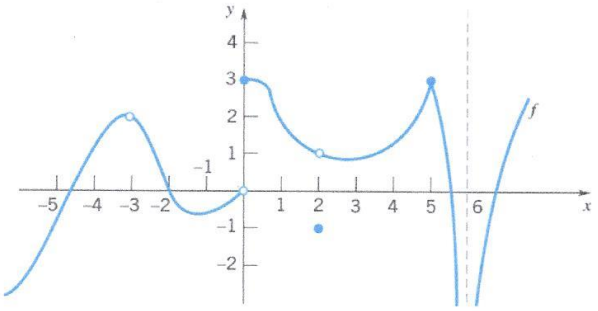
function did not exist but the limit did

14. What do you notice about the function and the limit when $x = 2$ ? Why?

$f(2) \neq \lim_{x \to 2} f(x)$ $f(x)$ IS NOT CONTINUOUS AT $x = 2$

15. What type of discontinuity is shown when $x = -3$, $x = 2$, and ~~$x = 5$~~ ?

REMOVABLE DISCONTINUITY




Given the graph above evaluate each of the following, if possible.

16. $f(0)$ — 3

17. $\lim_{x \to 0^-} f(x)$ — 0

18. $\lim_{x \to 0^+} f(x)$ — 3

19. $\lim_{x \to 0} f(x)$ — DNE

20. $f(6)$ — $\emptyset$

21. $\lim_{x \to 6^-} f(x)$ — $-\infty$

22. $\lim_{x \to 6^+} f(x)$ — $-\infty$

23. $\lim_{x \to 6} f(x)$ — $-\infty$

24. $\lim_{x \to -\infty} f(x)$ — $-\infty$

25. $\lim_{x \to \infty} f(x)$ — $\infty$

26. What do you notice about the function and the limit when $x = 0$ ? Why?

$f(0) \neq \lim_{x \to 0} f(x)$ $f(x)$ IS NOT CONTINUOUS at $x=0$

$f(0)$ exists but $\lim_{x \to 0} f(x)$ DOES NOT EXIST

27. What type of discontinuity is shown when $x = 0$ ?

JUMP DISCONTINUITY

NON - REMOVABLE DISCONTINUITY

28. What do you notice about the function and the limit when $x = 6$ ? Why?

$f(6) \neq \lim_{x \to 6} f(x)$ $f(x)$ IS NOT CONTINUOUS AT $x=6$

$f(6)$ DNE $\lim_{x \to 6} f(x)$ DNE IT APPROACHES $-\infty$

29. What type of discontinuity is shown when $x = 6$ ?

INFINITE DISCONTINUITY

NON - REMOVABLE DISCONTINUITY

30. Evaluate the following, given $f(x) = \frac{1}{x}$

a) $f(0)$ — $\emptyset$

b) $\lim_{x \to 0^-} f(x)$ — $-\infty$

c) $\lim_{x \to 0^+} f(x)$ — $\infty$

d) $\lim_{x \to 0} f(x)$ — DNE