

1 Find Limits Graphically

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

4.
$$\begin{cases} f(4) = \\ \lim_{x \rightarrow 4^-} f(x) = \\ \lim_{x \rightarrow 4^+} f(x) = \\ \lim_{x \rightarrow 4} f(x) = \end{cases}$$

7.
$$\begin{cases} f(7) = \\ \lim_{x \rightarrow 7^-} f(x) = \\ \lim_{x \rightarrow 7^+} f(x) = \\ \lim_{x \rightarrow 7} f(x) = \end{cases}$$

2.
$$\begin{cases} f(2) = \\ \lim_{x \rightarrow 2^-} f(x) = \\ \lim_{x \rightarrow 2^+} f(x) = \\ \lim_{x \rightarrow 2} f(x) = \end{cases}$$

5.
$$\begin{cases} f(5) = \\ \lim_{x \rightarrow 5^-} f(x) = \\ \lim_{x \rightarrow 5^+} f(x) = \\ \lim_{x \rightarrow 5} f(x) = \end{cases}$$

3.
$$\begin{cases} f(3) = \\ \lim_{x \rightarrow 3^-} f(x) = \\ \lim_{x \rightarrow 3^+} f(x) = \\ \lim_{x \rightarrow 3} f(x) = \end{cases}$$

6.
$$\begin{cases} f(6) = \\ \lim_{x \rightarrow 6^-} f(x) = \\ \lim_{x \rightarrow 6^+} f(x) = \\ \lim_{x \rightarrow 6} f(x) = \end{cases}$$

2 Find Limits Involving Infinity Graphically

8.
$$\begin{cases} f(8) = \\ \lim_{x \rightarrow 8^-} f(x) = \\ \lim_{x \rightarrow 8^+} f(x) = \\ \lim_{x \rightarrow 8} f(x) = \end{cases}$$

10.
$$\begin{cases} f(10) = \\ \lim_{x \rightarrow 10^-} f(x) = \\ \lim_{x \rightarrow 10^+} f(x) = \\ \lim_{x \rightarrow 10} f(x) = \end{cases}$$

12.
$$\begin{cases} f(12) = \\ \lim_{x \rightarrow 12^-} f(x) = \\ \lim_{x \rightarrow 12^+} f(x) = \\ \lim_{x \rightarrow 12} f(x) = \end{cases}$$

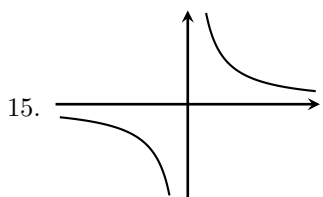
9.
$$\begin{cases} f(9) = \\ \lim_{x \rightarrow 9^-} f(x) = \\ \lim_{x \rightarrow 9^+} f(x) = \\ \lim_{x \rightarrow 9} f(x) = \end{cases}$$

11.
$$\begin{cases} f(11) = \\ \lim_{x \rightarrow 11^-} f(x) = \\ \lim_{x \rightarrow 11^+} f(x) = \\ \lim_{x \rightarrow 11} f(x) = \end{cases}$$

13.
$$\lim_{x \rightarrow -\infty} f(x) =$$

14.
$$\lim_{x \rightarrow +\infty} f(x) =$$

3 Famous Functions



$$f(x) = 1/x$$

$$f(0) =$$

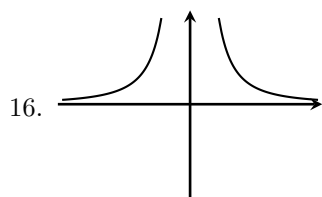
$$\lim_{x \rightarrow 0^-} f(x) =$$

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

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

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

$$\lim_{x \rightarrow +\infty} f(x) =$$



$$f(x) = 1/x^2$$

$$f(0) =$$

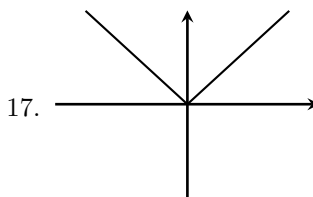
$$\lim_{x \rightarrow 0^-} f(x) =$$

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

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

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

$$\lim_{x \rightarrow +\infty} f(x) =$$



$$f(x) = |x|$$

$$f(0) =$$

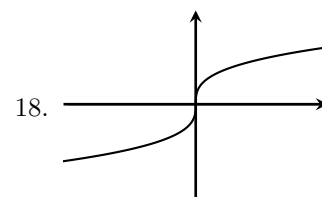
$$\lim_{x \rightarrow 0^-} f(x) =$$

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

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

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

$$\lim_{x \rightarrow +\infty} f(x) =$$



$$f(x) = \sqrt[3]{x}$$

$$f(0) =$$

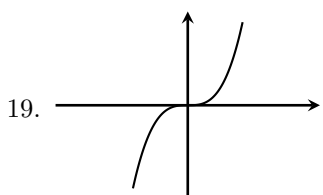
$$\lim_{x \rightarrow 0^-} f(x) =$$

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

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

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

$$\lim_{x \rightarrow +\infty} f(x) =$$



$$f(x) = x^3$$

$$f(0) =$$

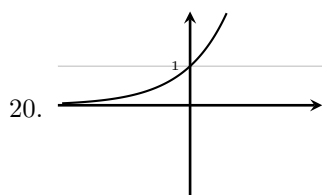
$$\lim_{x \rightarrow 0^-} f(x) =$$

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

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

$$\lim_{x \rightarrow +\infty} f(x) =$$



$$f(x) = e^x$$

$$f(0) =$$

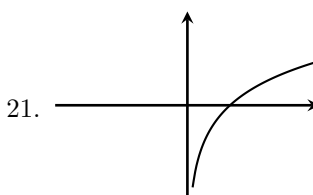
$$\lim_{x \rightarrow 0^-} f(x) =$$

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

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

$$\lim_{x \rightarrow +\infty} f(x) =$$



$$f(x) = \ln(x)$$

$$f(0) =$$

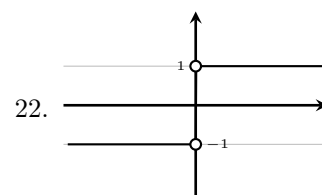
$$\lim_{x \rightarrow 0^-} f(x) =$$

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

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

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

$$\lim_{x \rightarrow +\infty} f(x) =$$



$$f(x) = \frac{|x|}{x}$$

$$f(0) =$$

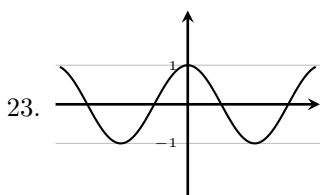
$$\lim_{x \rightarrow 0^-} f(x) =$$

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

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

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

$$\lim_{x \rightarrow +\infty} f(x) =$$



$$f(x) = \cos(x)$$

$$f(0) =$$

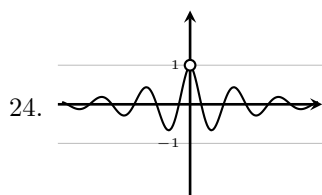
$$\lim_{x \rightarrow 0^-} f(x) =$$

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

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

$$\lim_{x \rightarrow -\infty} f(x) = \text{DNE}$$

$$\lim_{x \rightarrow +\infty} f(x) = \text{DNE}$$



$$f(x) = \frac{\sin(x)}{x}$$

$$f(0) =$$

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

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

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

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

$$\lim_{x \rightarrow +\infty} f(x) =$$



$$f(x) = \sin(1/x)$$

$$f(0) = \text{DNE}$$

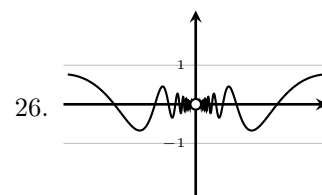
$$\lim_{x \rightarrow 0^-} f(x) = \text{DNE}$$

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

$$\lim_{x \rightarrow 0} f(x) = \text{DNE}$$

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

$$\lim_{x \rightarrow +\infty} f(x) =$$



$$f(x) = x \sin(1/x)$$

$$f(0) =$$

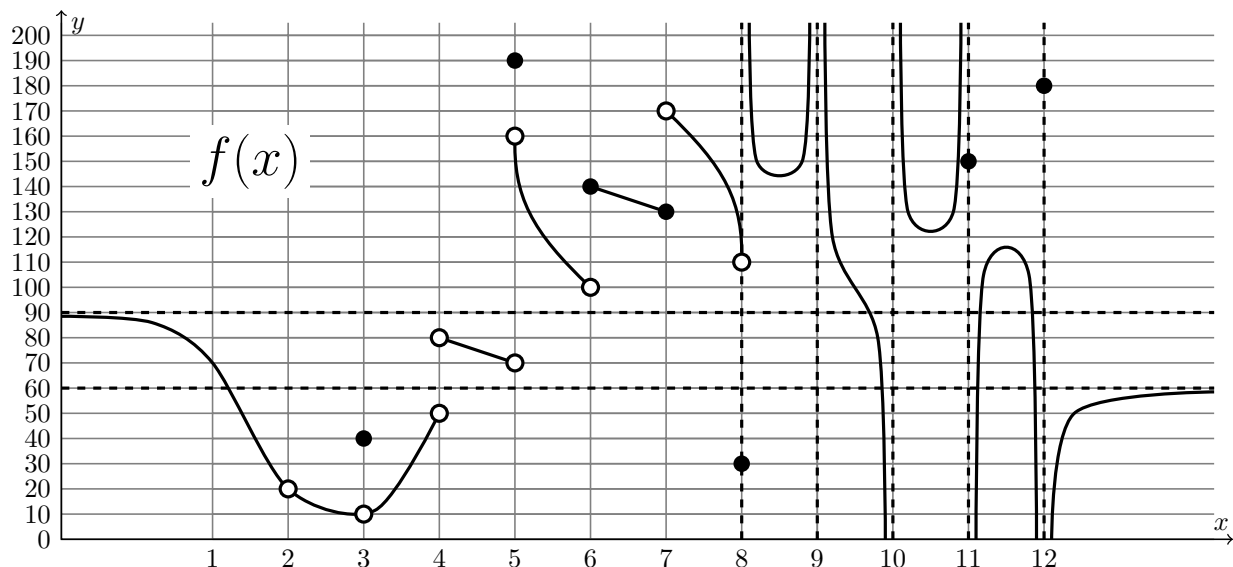
$$\lim_{x \rightarrow 0^-} f(x) =$$

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

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

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

$$\lim_{x \rightarrow +\infty} f(x) =$$



4 Identify Infinite, Jump, Removable Discontinuities Graphically

27. We say f is **continuous** (cts) at $x = a$ if $\lim_{x \rightarrow a} f(x)$ is finite and equals $f(a)$.

The function f above is continuous at integers $x =$ _____.

28. We say f has a _____ discontinuity at _____ if $\lim_{x \rightarrow a} f(x)$ is finite and *unequal* to $f(a)$.

The function f above has this type of discontinuity at integers $x =$ _____.

29. We say f has a _____ discontinuity at _____ if $\lim_{x \rightarrow a^+} f(x)$ and $\lim_{x \rightarrow a^-} f(x)$ are finite but *unequal*.

The function f above has this type of discontinuity at integers $x =$ _____.

30. We say f has an _____ discontinuity at _____ if $\lim_{x \rightarrow a^+} f(x)$ or $\lim_{x \rightarrow a^-} f(x)$ is infinite.

The function f above has this type of discontinuity at integers $x =$ _____.

5 Continuity on an Interval

31. We say f is **continuous on the open interval** (a, b) if f is continuous at every x in (a, b) .

Find the union of all open intervals **on which** f is **continuous**.

(Set-builder notation) _____

(Interval notation) _____

32. We say f is **continuous everywhere** if f is continuous at every x in _____.

33. We say f is a **continuous function** if f is continuous at every x in its _____.

6 Left and Right Continuity

34. We say f is _____ continuous at $x = a$ if $\lim_{x \rightarrow a^+} f(x)$ is finite and equals $f(a)$.

The function f above has this type of continuity at integers $x =$ _____.

35. We say f is _____ continuous at $x = a$ if $\lim_{x \rightarrow a^-} f(x)$ is finite and equals $f(a)$.

The function f above has this type of continuity at integers $x =$ _____.

36. We say f is **continuous on the closed interval** $[a, b]$ if f is continuous at every x in the *open* interval (a, b)

and is _____ at $x = a$ and is _____ at $x = b$.