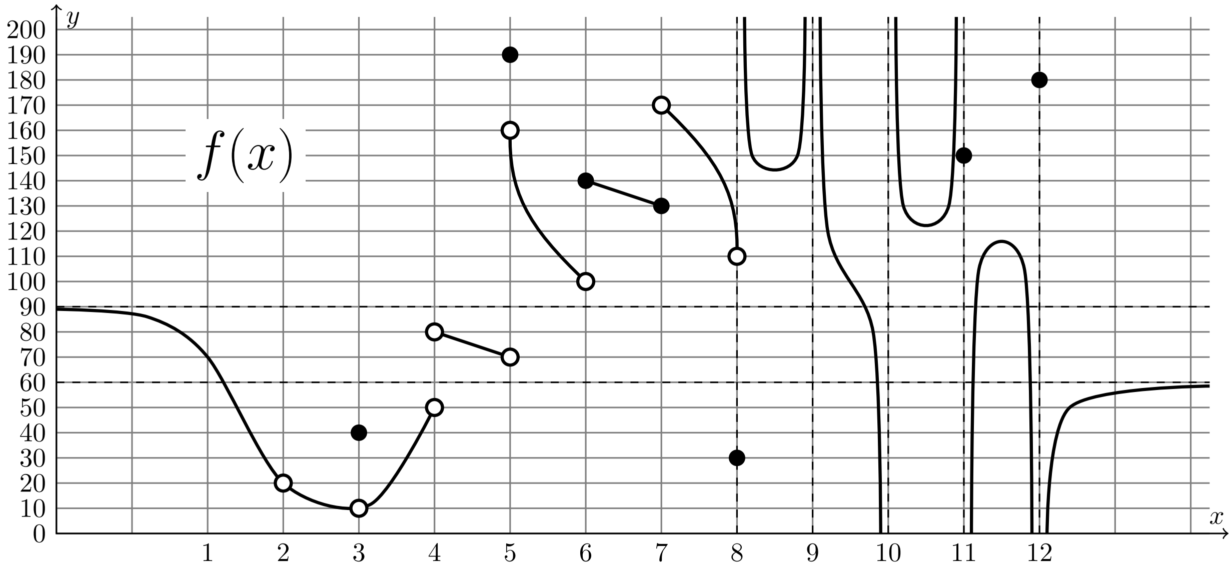


1 Finding Limits Graphically

1. $\begin{cases} f(1) = \\ \lim\limits_{x\to \mathbf{1}^-} f(x) = \\ \lim\limits_{x\to \mathbf{1}^+} f(x) = \\ \lim\limits_{x\to \mathbf{1}} f(x) = \end{cases}$

2. $\begin{cases} f(2) = \\ \lim\limits_{x\to \mathbf{2}^-} f(x) = \\ \lim\limits_{x\to \mathbf{2}^+} f(x) = \\ \lim\limits_{x\to \mathbf{2}} f(x) = \end{cases}$

3. $\begin{cases} f(3) = \\ \lim\limits_{x\to \mathbf{3}^-} f(x) = \\ \lim\limits_{x\to \mathbf{3}^+} f(x) = \\ \lim\limits_{x\to \mathbf{3}} f(x) = \end{cases}$

4. $\begin{cases} f(4) = \\ \lim\limits_{x\to \mathbf{4}^-} f(x) = \\ \lim\limits_{x\to \mathbf{4}^+} f(x) = \\ \lim\limits_{x\to \mathbf{4}} f(x) = \end{cases}$

5. $\begin{cases} f(5) = \\ \lim\limits_{x\to \mathbf{5}^-} f(x) = \\ \lim\limits_{x\to \mathbf{5}^+} f(x) = \\ \lim\limits_{x\to \mathbf{5}} f(x) = \end{cases}$

6. $\begin{cases} f(6) = \\ \lim\limits_{x\to \mathbf{6}^-} f(x) = \\ \lim\limits_{x\to \mathbf{6}^+} f(x) = \\ \lim\limits_{x\to \mathbf{6}} f(x) = \end{cases}$

7. $\begin{cases} f(7) = \\ \lim\limits_{x\to \mathbf{7}^-} f(x) = \\ \lim\limits_{x\to \mathbf{7}^+} f(x) = \\ \lim\limits_{x\to \mathbf{7}} f(x) = \end{cases}$

2 Infinite Limits and Limits at Infinity

8. $\begin{cases} f(8) = \\ \lim\limits_{x\to \mathbf{8}^-} f(x) = \\ \lim\limits_{x\to \mathbf{8}^+} f(x) = \\ \lim\limits_{x\to \mathbf{8}} f(x) = \end{cases}$

9. $\begin{cases} f(9) = \\ \lim\limits_{x\to \mathbf{9}^-} f(x) = \\ \lim\limits_{x\to \mathbf{9}^+} f(x) = \\ \lim\limits_{x\to \mathbf{9}} f(x) = \end{cases}$

10. $\begin{cases} f(10) = \\ \lim\limits_{x\to \mathbf{10}^-} f(x) = \\ \lim\limits_{x\to \mathbf{10}^+} f(x) = \\ \lim\limits_{x\to \mathbf{10}} f(x) = \end{cases}$

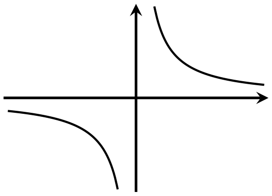
11. $\begin{cases} f(11) = \\ \lim\limits_{x\to \mathbf{11}^-} f(x) = \\ \lim\limits_{x\to \mathbf{11}^+} f(x) = \\ \lim\limits_{x\to \mathbf{11}} f(x) = \end{cases}$

12. $\begin{cases} f(12) = \\ \lim\limits_{x\to \mathbf{12}^-} f(x) = \\ \lim\limits_{x\to \mathbf{12}^+} f(x) = \\ \lim\limits_{x\to \mathbf{12}} f(x) = \end{cases}$

13. $\lim\limits_{x\to -\infty} g(x) =$

14. $\lim\limits_{x\to +\infty} g(x) =$

15.



$f(x) = 1/x$

$f(0) =$

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

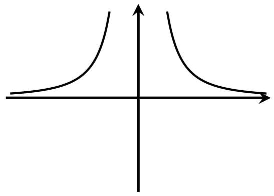
$\lim_{x\to\mathbf{0}^+} f(x) =$

$\lim_{x\to\mathbf{0}} f(x) =$

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

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

16.



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

$f(0) =$

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

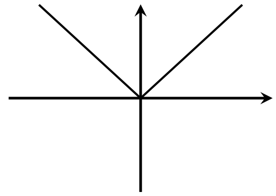
$\lim_{x\to\mathbf{0}^+} f(x) =$

$\lim_{x\to\mathbf{0}} f(x) =$

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

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

17.



$f(x) = |x|$

$f(0) =$

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

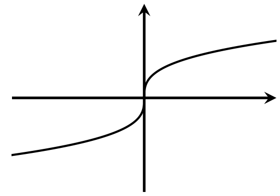
$\lim_{x\to\mathbf{0}^+} f(x) =$

$\lim_{x\to\mathbf{0}} f(x) =$

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

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

18.



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

$f(0) =$

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

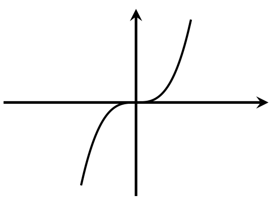
$\lim_{x\to\mathbf{0}^+} f(x) =$

$\lim_{x\to\mathbf{0}} f(x) =$

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

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

19.



$f(x) = x^3$

$f(0) =$

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

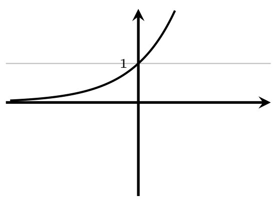
$\lim_{x\to\mathbf{0}^+} f(x) =$

$\lim_{x\to\mathbf{0}} f(x) =$

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

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

20.



$f(x) = e^x$

$f(0) =$

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

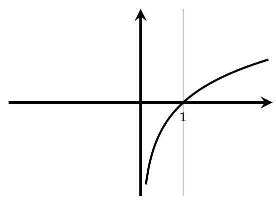
$\lim_{x\to\mathbf{0}^+} f(x) =$

$\lim_{x\to\mathbf{0}} f(x) =$

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

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

21.



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

$f(0) =$

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

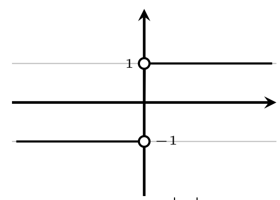
$\lim_{x\to\mathbf{0}^+} f(x) =$

$\lim_{x\to\mathbf{0}} f(x) =$

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

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

22.



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

$f(0) =$

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

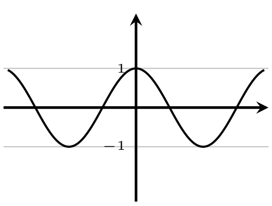
$\lim_{x\to\mathbf{0}^+} f(x) =$

$\lim_{x\to\mathbf{0}} f(x) =$

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

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

23.



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

$f(0) =$

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

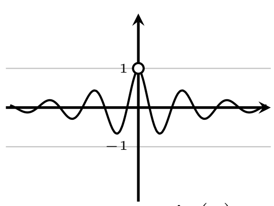
$\lim_{x\to\mathbf{0}^+} f(x) =$

$\lim_{x\to\mathbf{0}} f(x) =$

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

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

24.



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

$f(0) =$

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

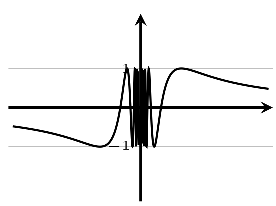
$\lim_{x\to\mathbf{0}^+} f(x) =$

$\lim_{x\to\mathbf{0}} f(x) =$

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

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

25.



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

$f(0) =$

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

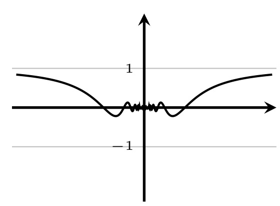
$\lim_{x\to\mathbf{0}^+} f(x) =$

$\lim_{x\to\mathbf{0}} f(x) =$

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

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

26.



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

$f(0) =$

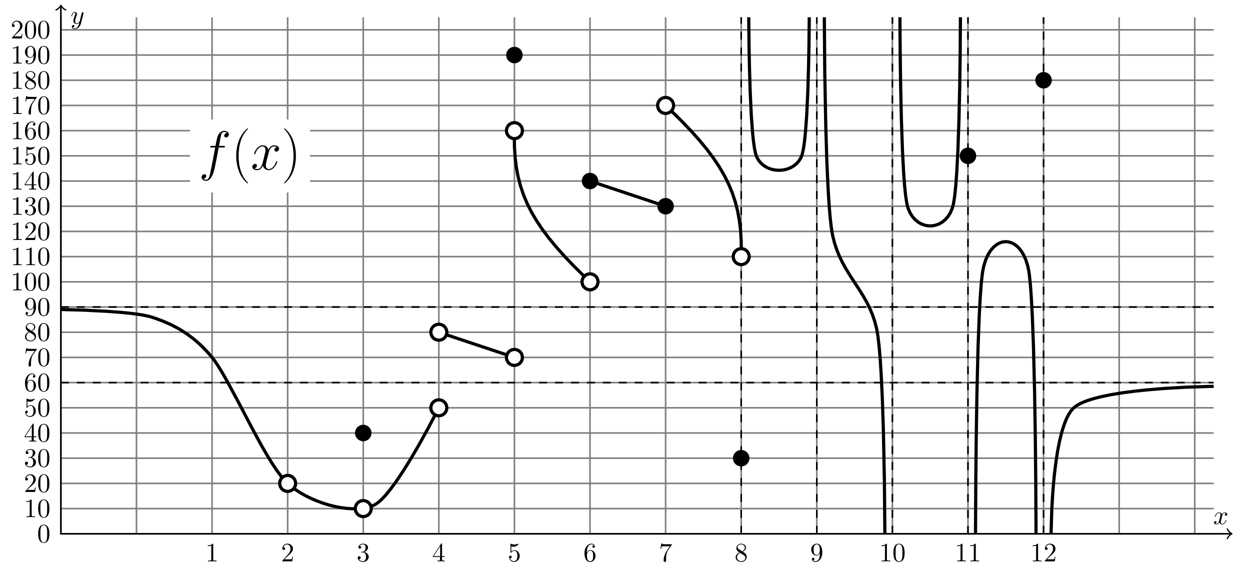
$\lim_{x\to\mathbf{0}^-} f(x) =$

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

$\lim_{x\to\mathbf{0}} f(x) =$

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

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



3 Identify Continuity/Discontinuity at a Point

27. We say $f(x)$ is ______________________________ if $\lim_{x \to a} f(x)$ exists and equals $f(a)$.
28. We say $f(x)$ has a ______________________________ at $x = a$ if $\lim_{x \to a} f(x)$ exists and does *not* equal $f(a)$.
29. We say $f(x)$ has a ______________________________ if $\lim_{x \to a^+} f(x)$ and $\lim_{x \to a^-} f(x)$ exist and are *un*equal.
30. We say $f(x)$ has an ______________________________ if either $\lim_{x \to a^+} f(x)$ or $\lim_{x \to a^-} f(x)$ equals either ∞ or $-\infty$.
31. The function $f(x)$ is **continuous at $x =$** ______________________________.
32. The function $f(x)$ is has a **removable discontinuity at $x =$** ______________________________.
33. The function $f(x)$ is has a **jump discontinuity at $x =$** ______________________________.
34. The function $f(x)$ is has an **infinite discontinuity at $x =$** ______________________________.

4 Identify Left and Right Continuity at a Point

35. We say $f(x)$ is ______________________________ if $\lim_{x \to a^-} f(x)$ exists and equals $f(a)$.
36. We say $f(x)$ is ______________________________ if $\lim_{x \to a^+} f(x)$ exists and equals $f(a)$.
37. The function $f(x)$ is **left continuous at $x =$** ______________________________.
38. The function $f(x)$ is **right continuous at $x =$** ______________________________.

5 Continuity on an Interval

We say $f(x)$ is **continuous on (a, b)** if $f(x)$ is continuous at $x = c$ for all c in (a, b).

39. We say $f(x)$ is **continuous on $[a, b]$** if $f(x)$ is continuous at $x = c$ for all c in (a, b),

    and ______________________________ and ______________________________.
40. We say $f(x)$ is **continuous everywhere** if $f(x)$ is continuous at $x = c$ for all c in ______________.
41. We say $f(x)$ is **continuous** if it is continuous on every open interval in ______________________________.
42. Find the union of all open intervals (a, b) such that $f(x)$ is **continuous on (a, b)**. Use interval notation.
43. The function $f(x)$ fails to be **continuous** (on every open interval in its domain). It fails at $x =$ ____________________.