

Problem Set 2-5

Quick Review



Refer to Figure 2-5e for Problems Q1–Q10.

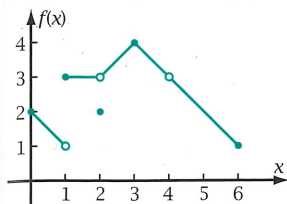


Figure 2-5e

Q1. $\lim_{x \rightarrow 1} f(x) = \text{---?---}$

Q2. $\lim_{x \rightarrow 2} f(x) = \text{---?---}$

Q3. $\lim_{x \rightarrow 3} f(x) = \text{---?---}$

Q4. $\lim_{x \rightarrow 4} f(x) = \text{---?---}$

Q5. $\lim_{x \rightarrow 5} f(x) = \text{---?---}$

Q6. Is f continuous at $x = 1$?

Q7. Is f continuous at $x = 2$?

Q8. Is f continuous at $x = 3$?

Q9. Is f continuous at $x = 4$?

Q10. Is f continuous at $x = 5$?

1. For piecewise function f in Figure 2-5f, what do these limits appear to be?

$\lim_{x \rightarrow -\infty} f(x)$	$\lim_{x \rightarrow -3^-} f(x)$
$\lim_{x \rightarrow -3^+} f(x)$	$\lim_{x \rightarrow 1} f(x)$
$\lim_{x \rightarrow 2} f(x)$	$\lim_{x \rightarrow 3^-} f(x)$
$\lim_{x \rightarrow 3^+} f(x)$	$\lim_{x \rightarrow \infty} f(x)$

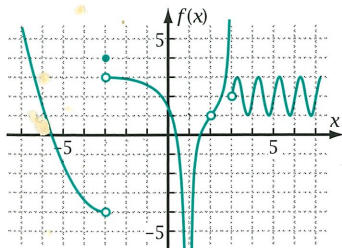


Figure 2-5f

2. For piecewise function g in Figure 2-5g, what do these limits appear to be?

$\lim_{x \rightarrow -\infty} g(x)$	$\lim_{x \rightarrow -2^-} g(x)$
$\lim_{x \rightarrow -2^+} g(x)$	$\lim_{x \rightarrow 1^-} g(x)$
$\lim_{x \rightarrow 2} g(x)$	$\lim_{x \rightarrow 3^-} g(x)$
$\lim_{x \rightarrow \infty} g(x)$	

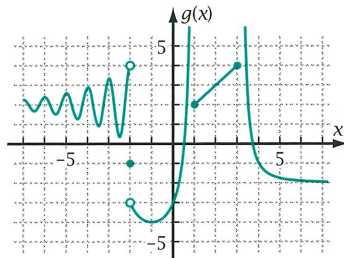


Figure 2-5g

For Problems 3–6, sketch the graph of a function that has the given features.

3. $\lim_{x \rightarrow 2^-} f(x) = \infty$ and $\lim_{x \rightarrow 2^+} f(x) = \infty$
4. $\lim_{x \rightarrow 2^-} f(x) = \infty$ and $\lim_{x \rightarrow 2^+} f(x) = -\infty$
5. $\lim_{x \rightarrow \infty} f(x) = -5$ and $\lim_{x \rightarrow -\infty} f(x) = 7$
6. $\lim_{x \rightarrow \infty} f(x) = \infty$ and $\lim_{x \rightarrow -\infty} f(x) = \infty$

7. Let $f(x) = 2 + \frac{1}{x-3}$.

a. Sketch the graph of f .

b. Find $\lim_{x \rightarrow 3^+} f(x)$, $\lim_{x \rightarrow 3^-} f(x)$, $\lim_{x \rightarrow 3} f(x)$, $\lim_{x \rightarrow \infty} f(x)$, and $\lim_{x \rightarrow -\infty} f(x)$.

c. Find a value of x on the positive side of 3 for which $f(x) = 100$. Choose several values of x closer to 3 than this, and show numerically that $f(x) > 100$ for all of these values. What does it mean to say that the limit of $f(x)$ is infinity as x approaches 3 from the positive side? How is the line $x = 3$ related to the graph of f ?

d. What value of $x > 3$ makes $f(x) = 2.001$? Choose several values of x greater than this number and show numerically that $f(x)$ is within 0.001 unit of 2 for each of these