Test 1

This is a preview of the published version of the quiz

Started: Feb 21 at 9:23am

Quiz Instructions

Choose the best answer for each problem.

Question 1

2 pts

Suppose $\lim_{x \to c} f(x) = L$. Which one of the following must be true?

- $f(x)$ is defined on both sides of $x = c$.
- $f(c) = L$
- $f(x)$ is defined at $x = c$.
- Substituting c for x results in the form $0/0$.

Question 2

2 pts

Suppose you were asked to use a table of values to estimate the limit of $f(x)$ at $x = 3$. Which list of x-values shown below would be best for your table?

- $x = 3.1,\ 3.01,\ 3.001,\ 3.0001,\ 2.9$
- $x = 3.01,\ 3.001,\ 3.0001,\ 3,\ 2.99,\ 2.999,\ 2.9999$
- $x = 0,\ 1,\ 2,\ 3,\ 4,\ 5$
- $x = 3.1,\ 3.01,\ 3.001,\ 2.9,\ 2.99,\ 2.999$

Question 3

2 pts

Which one of these is true about the limit concept?

- ◯ If a function is defined, then it must have a limit.
- ◯ The limit tells about about the value of the function at the limit point.
- ◯ To obtain the limit, you substitute the limit point into the function.
- ◯ The limit tells us about the behavior of the function near the limit point.

Question 4

5 pts

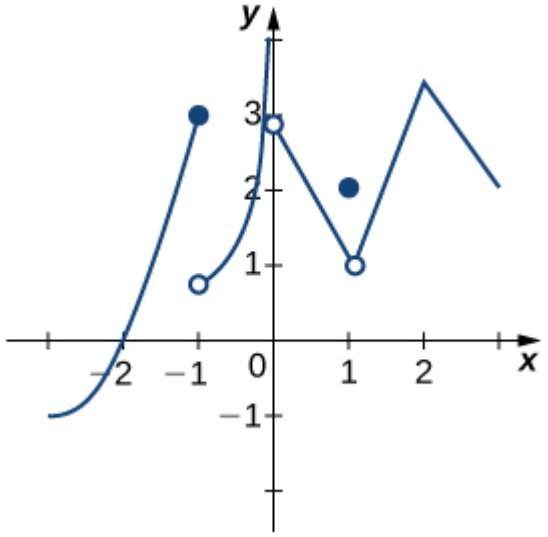
Use a table of numerical values to estimate the limit: $\lim_{x \to 0} \frac{5^{2x} - 1}{6x}$

- ◯ The limit does not exist.
- ◯ 0.5000
- ◯ 0.5365
- ◯ 0.8333

Question 5

3 pts

The graph of the function f is shown below. Use the graph to estimate $\lim_{x \to 1} f(x)$.



- ○ The limit does not exist.
- ○ 2
- ○ 3
- ○ 1

Question 6

2 pts

Suppose $\lim_{t \to 4} f(t) = 7$. Which statement below is correct?

- ○ $f(4)$ cannot be defined.
- ○ $f(4)$ must be equal to 7.
- ○ $f(4)$ cannot be equal to 7.
- ○ $f(4)$ may or may not be defined.

Question 7

3 pts

Which one of these limits fails to exist because the limit from the left does not equal the limit from the right?

- $\lim_{x \to 0} \dfrac{\sqrt{x^2}}{x^2 + x}$
- $\lim_{x \to 0} \sqrt{x + 5}$
- $\lim_{x \to 5} \dfrac{|x - 5|}{(x - 5)^2}$
- $\lim_{x \to 2} f(x)$, where $f(x) = \begin{cases} 5x + 2, & x < 2 \\ x^2 + x + 6, & x > 2 \end{cases}$

Question 8

3 pts

Explain why this limit fails to exist: $\lim_{x \to 0} \cos\left(\dfrac{1}{x^2}\right)$

- The function values grow without bound as the limit point is approached.
- The function is not defined on both sides of the limit point.
- The limit from the left does not equal the limit from the right.
- The function values oscillate as the limit point is approached.

Question 9

3 pts

Explain why this limit fails to exist: $\lim_{x \to 0} \dfrac{x}{\ln x}$

- The function is not defined on both sides of the limit point.
- The function values grow without bound as the limit point is approached.

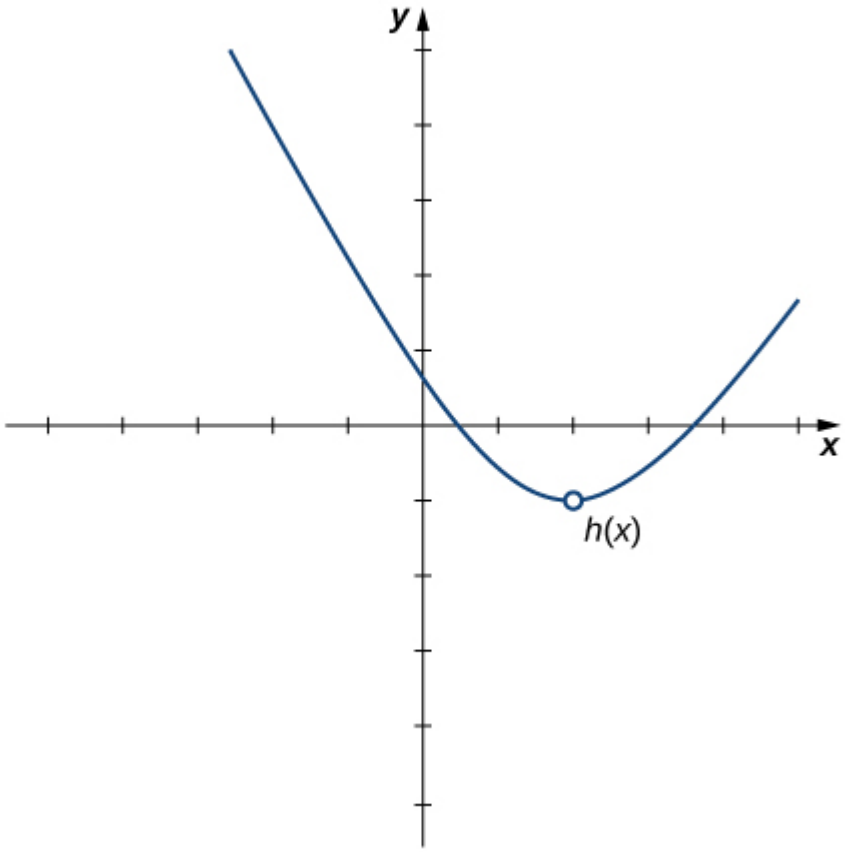
- ◯ The function values oscillate as the limit point is approached.
- ◯ The limit from the left does not equal the limit from the right.

Question 10

3 pts

The graph of the function h is shown below. Use the graph to estimate $\lim_{x \to 2^+} h(x)$.

Assume each tick mark on the graph represents one unit.



- ◯ The limit does not exist.
- ◯ 0.75
- ◯ 0
- ◯ -1

Question 11

2 pts

Suppose $\lim_{x \to 6} f(x) = -9$. Which one of the following must be true?

- ○ $\lim_{x \to 6^+} f(x) = 9$
- ○ None of these
- ○ $\lim_{x \to 6^-} f(x) = -9$
- ○ $\lim_{x \to -6} f(x) = 9$

Question 12

5 pts

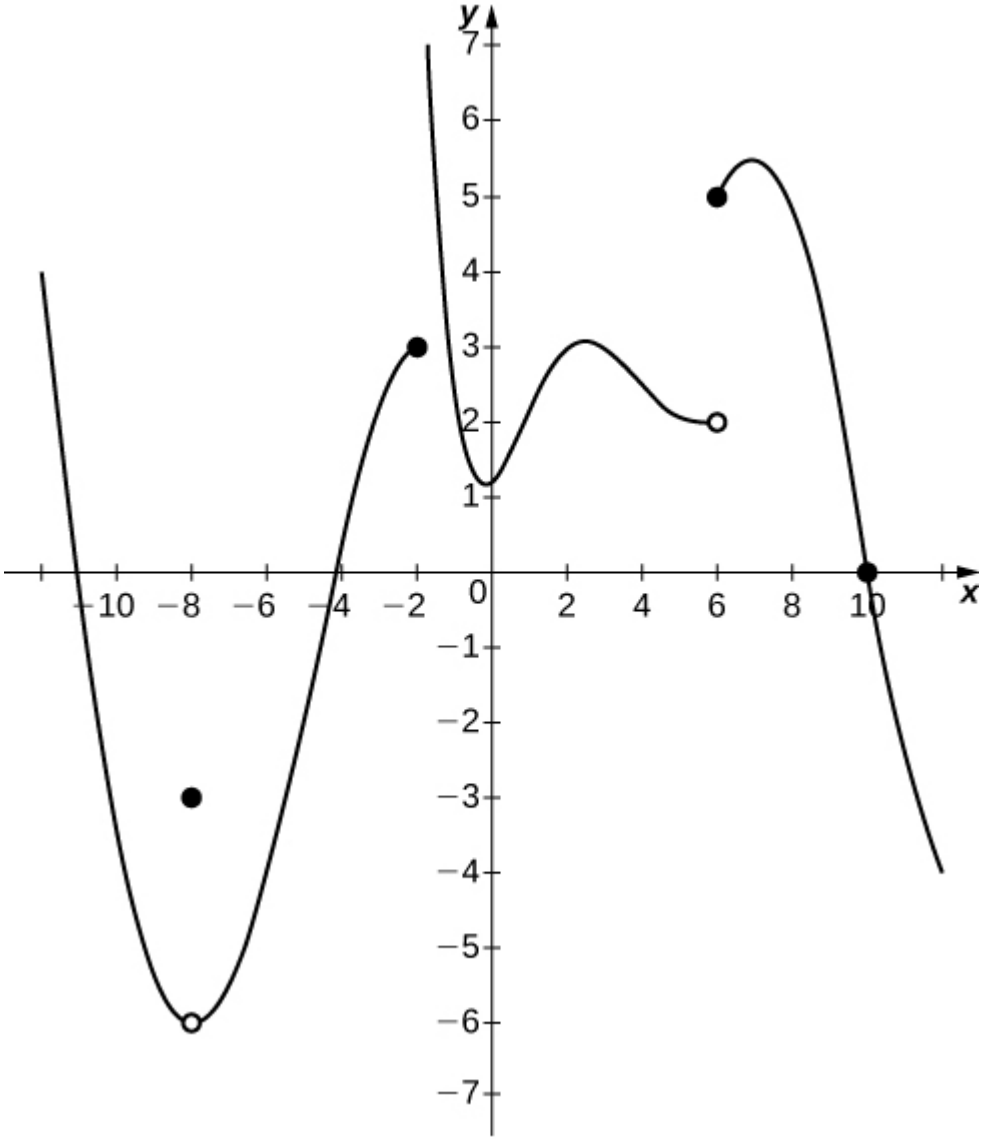
Evaluate the limit: $\lim_{w \to 7^-} \dfrac{w^2 - 49}{w + 7}$

- ○ -14
- ○ 0
- ○ $0/0$
- ○ The limit does not exist.

Question 13

3 pts

The graph of the function f is shown below. Use the graph to estimate $\lim_{x \to -2^+} f(x)$.



- ○ 5
- ○ $+\infty$
- ○ 3
- ○ 6

Question 14

6 pts

Evaluate the limit: $\lim_{y \to 2} \dfrac{5y - 10}{\sqrt{y} - \sqrt{2}}$

- ○ $-\sqrt{2}$
- ○ $0/0$
- ○ $6\sqrt{2}$
- ○ $10\sqrt{2}$

Question 15

6 pts

Evaluate the limit: $\lim_{x \to 1} \dfrac{\sin(2x-2)}{\pi x - \pi}$

- ○ 1
- ○ $2/\pi$
- ○ None of these
- ○ 0

Question 16

6 pts

Evaluate the limit: $\lim_{x \to -3^+} \left(\dfrac{x^2 - x - 12}{x^2 + 8x + 15} \right)$

- ○ The limit does not exist.
- ○ $-7/8$
- ○ 0
- ○ $-7/2$

Question 17

6 pts

Determine the value of c so that f is continuous everywhere.

$$f(x) = \begin{cases} x^2 + cx + 7, & x \leq 3 \\ 3x^2 - 1, & x > 3 \end{cases}$$

- ○ There is no value of c that will make the function continuous.
- ○ $c = 10/3$
- ○ c can be any real number.
- ○ $c = 64/3$

Question 18

4 pts

Let $f(x) = \dfrac{3\tan x}{6x}$. Which of these is a vertical asymptote of the graph of f?

- ○ $x = 0$
- ○ None of these
- ○ $x = \pi$
- ○ $x = \pi/2$

Question 19

5 pts

The graph of f does NOT have a vertical asymptote at $x = 5$. Find the value of c.

$$f(x) = \frac{2x^2 + cx + 20}{x - 5}$$

- ○ $c = 14$

- ○ $c = 0$
- ○ $c = -7$
- ○ $c = -14$

Question 20

3 pts

Which one of these functions is NOT continuous at $x = 2$?

- ○ $f(x) = \dfrac{x^2 - 2}{x^2 - x - 2}$
- ○ $f(x) = \tan x$
- ○ $f(x) = 13$
- ○ $f(x) = \dfrac{x^2 + \pi \cos x}{\sqrt{xe^x}}$

Question 21

4 pts

Find and classify the discontinuity of $g(x) = \dfrac{x^2 - 9}{x + 3}$.

- ○ $x = -3$ (Infinite)
- ○ $x = -3$ (Removable)
- ○ There are no discontinuities.
- ○ $x = 3$ (Infinite)

Question 22

4 pts

Suppose that $\lim_{x \to 1} \dfrac{x^2 - 1}{g(x)} = 37$. Assuming it exists, determine the value of $\lim_{x \to 1} g(x)$.

- ○ $\lim_{x \to 1} g(x) = 0$
- ○ $\lim_{x \to 1} g(x) = 37$
- ○ $\lim_{x \to 1} g(x) = -1$
- ○ $\lim_{x \to 1} g(x) = 1$

Question 23

2 pts

True or false: If $p(x)$ is a polynomial function, then the limit at any point can ALWAYS be determined by direct substitution.

- ○ True
- ○ False

Question 24

2 pts

True or false: If f is continuous at $x = -2$, then $\lim_{x \to -2^-} f(x) = f(-2)$.

- ○ True
- ○ False

Question 25

3 pts

Suppose that $f(5) = 9$ and that f is NOT continuous at $x = 5$. Which one of these CANNOT be true?

- ○ $\lim_{x \to 5} f(x)$ does not exist
- ○ $\lim_{x \to 5^-} f(x) = 9$
- ○ $\lim_{x \to 5^+} f(x) = 9$
- ○ $\lim_{x \to 5} f(x) = 9$

Question 26

4 pts

Suppose that $\lim_{y \to 7} h(y)$ exists and that $\lim_{y \to 7} \left(\frac{2y - h(y)}{\frac{1}{7} - \frac{1}{y}} \right)$ also exists. Determine $\lim_{y \to 7} h(y)$.

- ○ $\lim_{y \to 7} h(y) = 7$
- ○ None of these
- ○ $\lim_{y \to 7} h(y) = 0$
- ○ $\lim_{y \to 7} h(y) = 14$

Question 27

2 pts

True or false: The limit of any trigonometric function can ALWAYS be determined by direct substitution.

- ◯ True
- ◯ False

Question 28

5 pts

The function f has two discontinuities. Find and classify them.

$$f(x) = \begin{cases} (x^2 - 4)/(x - 2), & x < 2 \\ 3x - 4, & 2 \leq x < 5 \\ x^2 - 14, & x > 5 \end{cases}$$

- ◯ $x = 2$ (Jump) and $x = 5$ (Jump)
- ◯ $x = 2$ (Jump) and $x = 5$ (Removable)
- ◯ $x = 2$ (Removable) and $x = 5$ (Removable)
- ◯ $x = 2$ (Infinite) and $x = 5$ (Jump)

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