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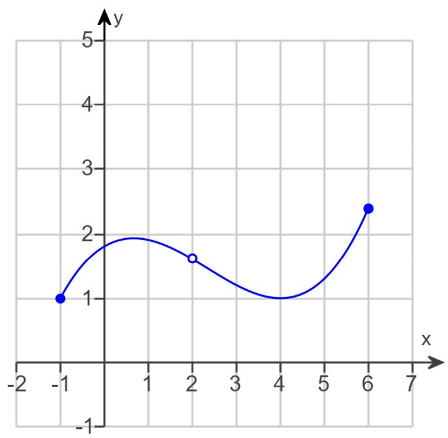
Course: Calc 1 11:30 AM / Internet (81749&81750) Shcherban

Assignment: 2.5 Continuity

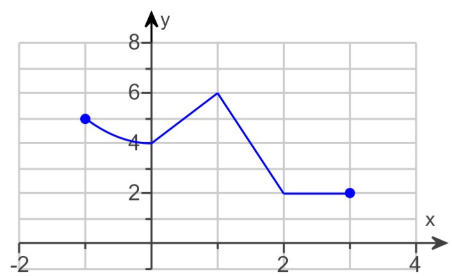
1. Say whether the function graph below is continuous on $[-1,6]$. If not, where does it fail to be continuous?



Select the correct answer below and, if necessary, fill in the answer box to complete your choice.

- **A.** The graph is not continuous on the interval ______.
  (Type your answer in interval notation.)
- **B.** The graph is not continuous at $x = 2$.
  (Use a comma to separate answers as needed.)
- **C.** The graph is continuous on $[-1,6]$.

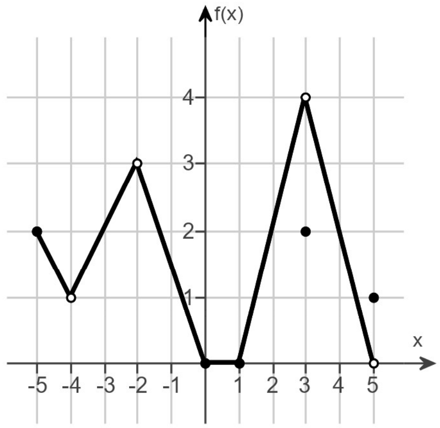
2. State whether the function graphed is continuous on $[-1,3]$. If not, where does it fail to be continuous and why?



Is the function continuous on the interval $[-1,3]$? If not, why?

- **A.** The function is not continuous at $x = 1$ because of a jump discontinuity.
- **B.** The function is continuous on the interval $[-1,3]$.
- **C.** The function is not continuous at $x = 1$ because of a removable discontinuity.
- **D.** The function is not continuous at $x = 1$ because of an oscillating discontinuity.

3.
Use the graph to answer the questions about existence, limits, and continuity.



Does f(1) exist?

- Yes ✓
- No

Does $\lim_{x \to 1} f(x)$ exist?

- No
- Yes ✓

Does $\lim_{x \to 1} f(x)$ equal f(1)?

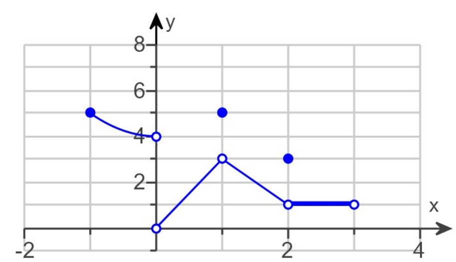
- No
- Yes ✓

Is the function continuous at $x = 1$?

- No
- Yes ✓

4.
Use the function and the accompanying figure to answer the following questions.

$$f(x) = \begin{cases} x^2 - 4, & -1 \le x < 0 \\ 3x, & 0 < x < 1 \\ 5, & x = 1 \\ -2x + 5, & 1 < x < 2 \\ 3, & x = 2 \\ 1, & 2 < x < 3 \end{cases}$$



a. Is f defined at $x = 2$?

- No
- Yes ✓

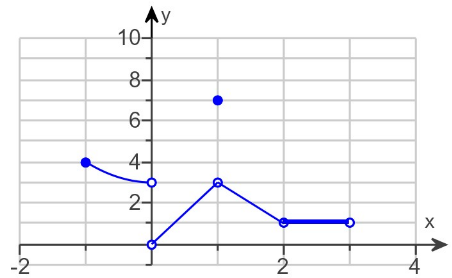
b. Is f continuous at $x = 2$?

- No ✓
- Yes

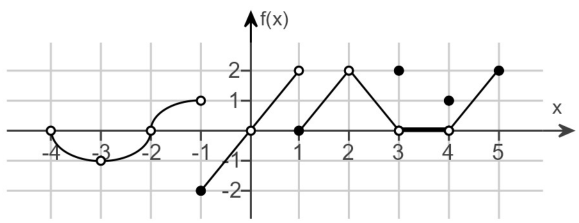
5. What value should be assigned to f(2) to make the extended function continuous at $x = 2$?

f(2) = 1 (Simplify your answer.)

$$f(x) = \begin{cases} x^2 - 3, & -1 \le x < 0 \\ 3x, & 0 < x < 1 \\ 7, & x = 1 \\ -2x + 5, & 1 < x < 2 \\ 1, & 2 < x < 3 \end{cases}$$



6. Use the graph to answer the question about discontinuity.



Select the correct description of the continuity of f(x) at $x = -3$.

- **A.** There is a non-removable discontinuity because f(x) is not defined at $x = -3$.
- **B.** There is a discontinuity that can be removed by defining $f(-3) = -1$.
- **C.** There is a discontinuity that can be removed by defining $f(-3) = -3$.

7. Determine the point(s) at which the given function f(x) is continuous.

$$f(x) = \frac{14}{x-3} - 9x$$

Describe the set of x-values where the function is continuous, using interval notation.

$(-\infty,3)\cup(3,\infty)$

(Use interval notation.)

8. At what points is the function $y = \dfrac{x+6}{x^2 - 11x + 30}$ continuous?

Describe the set of x-values where the function is continuous, using interval notation.

$(-\infty,5)\cup(5,6)\cup(6,\infty)$

(Simplify your answer. Type your answer in interval notation.)

9. At what points is the function $y = \dfrac{\sin x}{4x+8}$ continuous?

Describe the set of x-values where the function is continuous, using interval notation.

$(-\infty, -2) \cup (-2, \infty)$

(Simplify your answer. Type your answer in interval notation.)

10. Determine the point(s) at which the given function f(x) is continuous.

$f(x) = 5 \csc(10x)$

The function is continuous on $(-\infty, \infty)$ except for $\dfrac{n\pi}{10}$.

(Type an exact answer, using π as needed. Type an expression using n, where n is an integer.)

11. Determine the point(s) at which the given function f(x) is continuous.

$f(x) = \sqrt{3x+15}$

Describe the set of x-values where the function is continuous, using interval notation.

$[-5, \infty)$

(Use interval notation.)

12. Determine the limit as x approaches the given x-coordinate and the continuity of the function at that x-coordinate.

$$\lim_{x \to -13\pi/16} \cos(8x - \cos(8x))$$

$\lim_{x \to -13\pi/16} \cos(8x - \cos(8x)) =$ 0

(Simplify your answer.)

Is $\cos(8x - \cos(8x))$ continuous at $x = -\dfrac{13\pi}{16}$?

- No
- Yes ✓

13. Find the following limit. Is the function continuous at the point being approached?

$$\lim_{y \to 1} \sec\left(y \sec^2 y - \tan^2 y - 1\right)$$

$\lim_{y \to 1} \sec\left(y \sec^2 y - \tan^2 y - 1\right) =$ 1 (Simplify your answer.)

Is the function continuous at the point being approached? Choose the correct answer below.

- Yes ✓
- No

14. Find the following limit. Is the function continuous at the point being approached?

$$\lim_{t \to 0} \cos\left(\frac{\pi}{\sqrt{11 - 2\sec 3t}}\right)$$

$$\lim_{t \to 0} \cos\left(\frac{\pi}{\sqrt{11 - 2\sec 3t}}\right) = \frac{1}{2}$$

(Type an exact answer, using radicals as needed.)

Is the given function continuous at $t = 0$?

- **A.** No
- **B.** Yes

15. Define g(5) for the given function so that it is continuous at $x = 5$.

$$g(x) = \frac{7x^2 - 175}{7x - 35}$$

Define g(5) as 10 .

(Simplify your answer.)

16. For what value of a is the following function continuous at every x?

$$f(x) = \begin{cases} x^2 - 72, & x < 18 \\ 2ax, & x \geq 18 \end{cases}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** a = 7
- **B.** There is no solution.