

Calculus Practice: Discontinuities 1a

Determine if each function is continuous. If the function is not continuous, find the x -axis location of and classify each discontinuity.

1) $f(x) = -\frac{x^2 - 2x - 8}{x + 2}$

- A) Removable discontinuity at: $x = 3$
Infinite discontinuity at: $x = 3$
- B) Removable discontinuity at: $x = 1$
Infinite discontinuity at: $x = 1$
- C) Removable discontinuity at: $x = -2$
- D) Continuous

2) $f(x) = \frac{x^2}{x + 1}$

- A) Oscillating discontinuity at: $x = -\pi$
- B) Removable discontinuity at: $x = 2$
Infinite discontinuity at: $x = 2$
- C) Continuous
- D) Infinite discontinuity at: $x = -1$

3) $f(x) = \begin{cases} 0, & x \leq 0 \\ -x^2 + 4x - 4, & x > 0 \end{cases}$

- A) Continuous
- B) Jump discontinuity at: $x = 0$
- C) Removable discontinuity at: $x = -2$
Infinite discontinuity at: $x = -2$
- D) Oscillating discontinuity at: $x = -2\pi$

4) $f(x) = x^3 + x^2 - x - 5$

- A) Jump discontinuity at: $x = 3$
- B) Continuous
- C) Jump discontinuity at: $x = 2$
- D) Oscillating discontinuity at: $x = 0$

5) $f(x) = \sin \frac{1}{x}$

- A) Oscillating discontinuity at: $x = -\pi$
- B) Oscillating discontinuity at: $x = 0$
- C) Oscillating discontinuity at: $x = 2\pi$
- D) Continuous

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

- A) Jump discontinuity at: $x = 2$
- B) Continuous
- C) Infinite discontinuity at: $x = -3$
- D) Removable discontinuity at: $x = -2$
Infinite discontinuity at: $x = -2$

7) $f(x) = x^4 - 4x^2 - 3x + 3$

- A) Continuous
- B) Removable discontinuity at: $x = 2$
Infinite discontinuity at: $x = 0$
- C) Removable discontinuity at: $x = -3$
- D) Removable discontinuity at: $x = 2$
Infinite discontinuity at: $x = -3$

8) $f(x) = -\frac{x + 3}{x^2 + 3x}$

- A) Jump discontinuity at: $x = 2$
- B) Removable discontinuity at: $x = 3$
Infinite discontinuity at: $x = -1$
- C) Continuous
- D) Removable discontinuity at: $x = -3$
Infinite discontinuity at: $x = 0$

9) $f(x) = -x^3 + 2x^2 + 3$

- A) Removable discontinuity at: $x = -1$
Infinite discontinuity at: $x = 2$
- B) Removable discontinuity at: $x = 2$
Infinite discontinuity at: $x = -3$
- C) Continuous
- D) Removable discontinuity at: $x = 3$

11) $f(x) = \cos \frac{1}{x}$

- A) Continuous
- B) Oscillating discontinuity at: $x = 0$
- C) Oscillating discontinuity at: $x = -3\pi$
- D) Oscillating discontinuity at: $x = -\pi$

13) $f(x) = \cos \frac{1}{x - \pi}$

- A) Oscillating discontinuity at: $x = \pi$
- B) Oscillating discontinuity at: $x = 2\pi$
- C) Oscillating discontinuity at: $x = 0$
- D) Continuous

15) $f(x) = \frac{x^2 - x - 12}{x + 3}$

- A) Removable discontinuity at: $x = 1$
Infinite discontinuity at: $x = 1$
- B) Continuous
- C) Removable discontinuity at: $x = 1$
Infinite discontinuity at: $x = -3$
- D) Removable discontinuity at: $x = -3$

17) $f(x) = \begin{cases} -x^2 - 2x - 2, & x < -3 \\ -2, & x \geq -3 \end{cases}$

- A) Removable discontinuity at: $x = 2$
Infinite discontinuity at: $x = 1$
- B) Jump discontinuity at: $x = 1$
- C) Continuous
- D) Jump discontinuity at: $x = -3$

10) $f(x) = -\frac{x^2 - 4}{x - 2}$

- A) Infinite discontinuity at: $x = 2$
- B) Jump discontinuity at: $x = -3$
- C) Removable discontinuity at: $x = 2$
- D) Continuous

12) $f(x) = -x^3 + 4x^2 - 5$

- A) Oscillating discontinuity at: $x = -3\pi$
- B) Removable discontinuity at: $x = 0$
- C) Continuous
- D) Removable discontinuity at: $x = 2$

14) $f(x) = \frac{x^2 - 1}{x + 1}$

- A) Jump discontinuity at: $x = -3$
- B) Removable discontinuity at: $x = -1$
- C) Continuous
- D) Removable discontinuity at: $x = 3$
Infinite discontinuity at: $x = -2$

16) $f(x) = \begin{cases} -x^2, & x < 1 \\ \frac{x}{2} - 3, & x \geq 1 \end{cases}$

- A) Jump discontinuity at: $x = 1$
- B) Infinite discontinuity at: $x = 2$
- C) Infinite discontinuities at: $x = -3, x = 3$
- D) Continuous

18) $f(x) = x^3 + 7x^2 + 15x + 7$

- A) Jump discontinuity at: $x = -2$
- B) Removable discontinuity at: $x = 1$
Infinite discontinuity at: $x = -1$
- C) Continuous
- D) Infinite discontinuities at: $x = -1, x = 0$

19) $f(x) = x^3 + 11x^2 + 35x + 28$

- A) Infinite discontinuity at: $x = -1$
- B) Removable discontinuity at: $x = 0$
Infinite discontinuity at: $x = -1$
- C) Removable discontinuity at: $x = 0$
Infinite discontinuity at: $x = -2$
- D) Continuous

20) $f(x) = \sin \frac{1}{x + \pi}$

- A) Oscillating discontinuity at: $x = -\pi$
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