

Continuity of Functions at a Point Worksheet

- Answer Key

1. $f(x) = |x|$ is continuous at $x = 0$.

True.

2. $f(x) = \begin{cases} 0 & \text{if } x < -1; \\ x + 1 & \text{if } x \geq -1. \end{cases}$ is continuous at $x = -1$.

True.

3. $f(x) = e^{-\frac{1}{(x-1)^2}}$ is discontinuous at $x = 1$.

False.

4. $f(x) = \begin{cases} (x-5)e^{x-5} & \text{if } x < 5; \\ \ln(x-4) & \text{if } x \geq 5. \end{cases}$ is a discontinuous function.

False.

5. $f(x) = \ln(x - a)$ is discontinuous at $x = a$

True.

6. $f(x) = \begin{cases} x^2 & \text{if } x \leq 2; \\ 3x^2 - 8 & \text{if } x > 2. \end{cases}$ is discontinuous at $x = 2$.

False.

7. $f(x) = \cot(x)$ is continuous at $x = \pi$.

False.

8. $f(x) = \begin{cases} x - 3 & \text{if } x < -2; \\ -5 & \text{if } -2 \leq x \leq 2; \\ x^2 + 1 & \text{if } v > 2. \end{cases}$ is a continuous function.

False.

9. $f(x) = \frac{\sin(x)}{x}$ is continuous at $x = 0$.

True.

10. $f(x) = \begin{cases} ax^2 + b & \text{if } x < 9; \\ ax(x + b) & \text{if } x \geq 9. \end{cases}$ is discontinuous for all values of a if $b = 0$.

False; it is continuous for all values of a is $b = 0$.

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