

# Continuity of Functions at a Point Worksheet

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

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

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

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

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

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

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.

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

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

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  $b = 0$ .

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