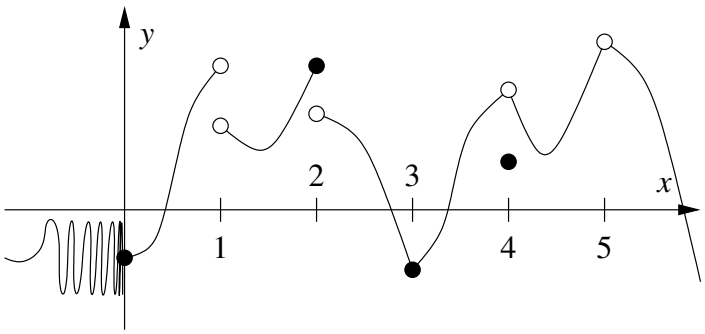
1. Suppose $f(x)$ has the following graph:



Assume that the part of the graph that looks like a "scribble" at $x = 0$ actually is a scribble (i.e., behaves like $\sin(1/x)$ near $x = 0$).

(a) For which of $a = 0, 1, 2, 3, 4, 5$ does $f(a)$ exist?

(b) For which of $a = 0, 1, 2, 3, 4, 5$ does $\lim_{x \to a} f(x)$ exist?

(c) At which of $a = 0, 1, 2, 3, 4, 5$ is $f(x)$ continuous from the left?

(d) At which of $a = 0, 1, 2, 3, 4, 5$ is $f(x)$ continuous from the right?

(e) At which of $a = 0, 1, 2, 3, 4, 5$ is $f(x)$ continuous?

2. Let

$$g(x) = \begin{cases} e^{x^2-2} & \text{for } x \leq 1, \\ \dfrac{\sqrt{x^2+1}}{x^2-3x-4} & \text{for } x > 1. \end{cases}$$

At which values of x is $g(x)$ **not** continuous? Explain.

3. Let

$$h(x) = \frac{x^2 - 4\tan x}{2\cos x + 1}.$$

At which values of x is $h(x)$ **not** continuous? Explain.

4. Let

$$k(x) = \begin{cases} 1 + \tan x & \text{for } x < 0, \\ \dfrac{x^2 - x - 2}{x^2 - 2} & \text{for } x \geq 0. \end{cases}$$

At which values of x is $k(x)$ **not** continuous? Explain.