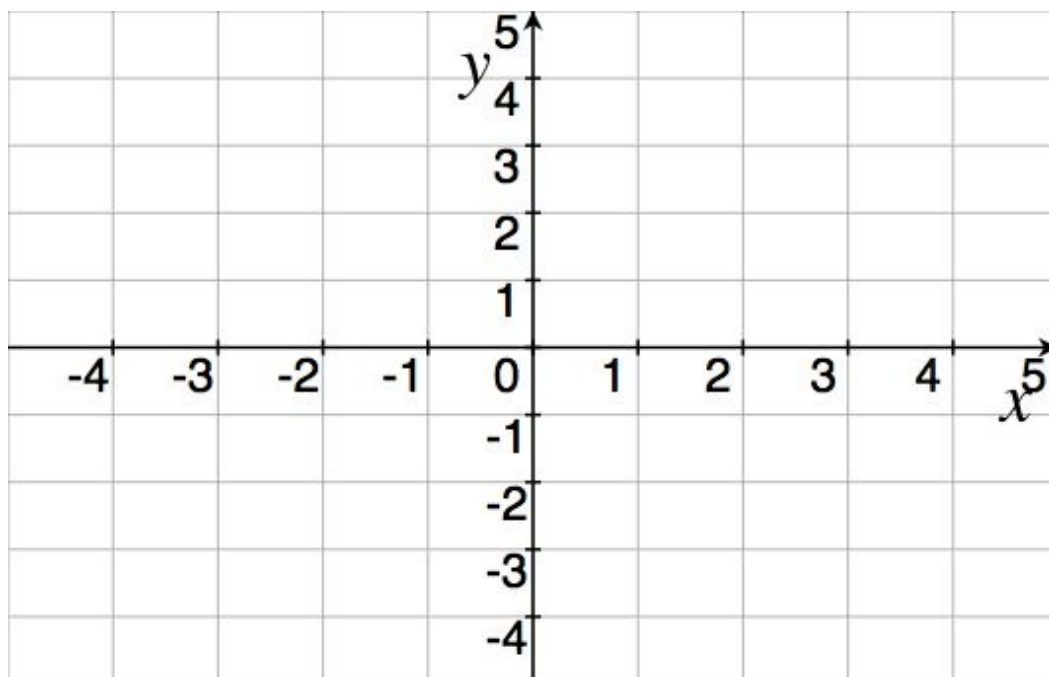


# Continuity

1. Consider the piecewise-defined function

$$f(x) = \begin{cases} \frac{(x+3)(x+4)}{x+4} & \text{if } x < -2 \\ -1 & \text{if } -2 \leq x \leq 0 \\ -1 + \log_2 x & \text{if } 0 < x \end{cases}$$

(a) Draw the graph of  $f$  on the axis below.

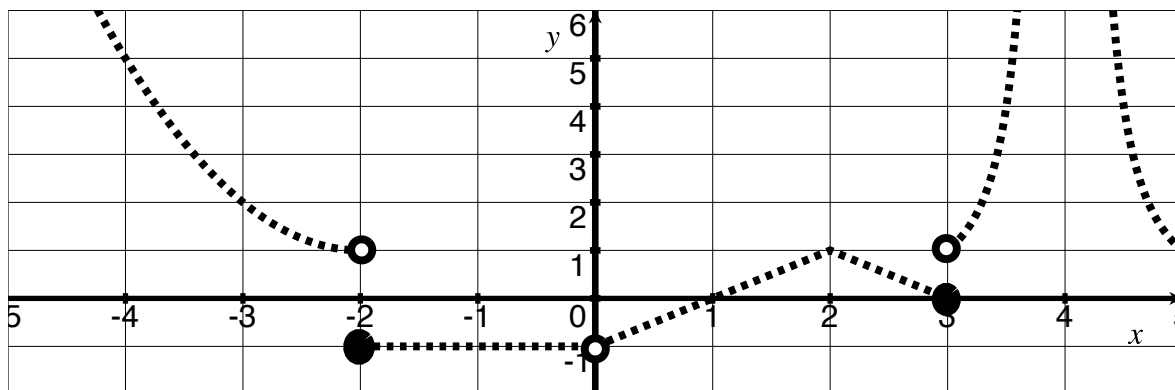


2. Find  $\lim_{x \rightarrow -2} f(x)$  either numerically or graphically.

3. Find  $f(-2)$

4. Is  $f$  continuous at  $x = -2$ ?

5. Let  $g$  be the piece-wise defined function below. This means the graph of  $g$  is the *entire* dotted graph shown below.



(a) Is  $g$  continuous at:

$$x = 0$$

$$x = 2$$

$$x = 3?$$

(b) Find all the points that  $g$  is discontinuous.

6. Sketch a graph of a function  $\alpha$  that satisfies *all* of the following:

$$\alpha(-1) = -3, \quad \lim_{x \rightarrow -1^+} \alpha(x) = 2, \quad \alpha \text{ is continuous on } (0, 3), \text{ and not continuous at } x = 4.$$

