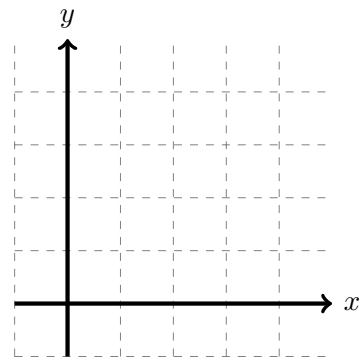
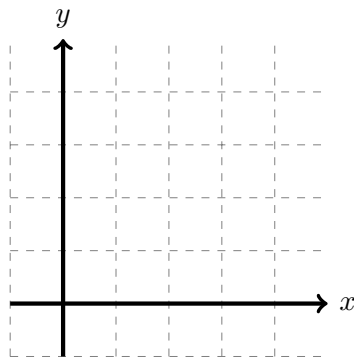
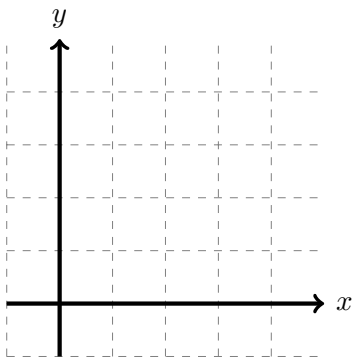
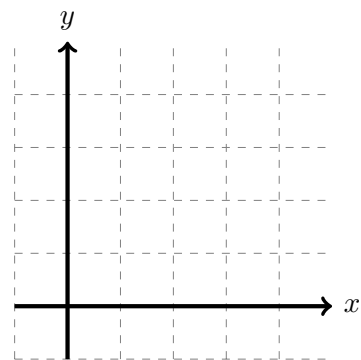
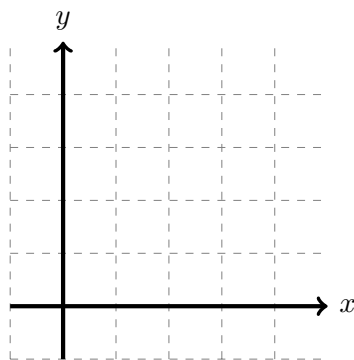
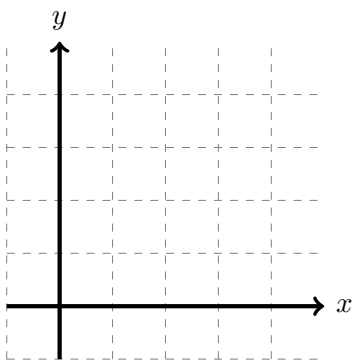


LECTURE NOTES 2-5: CONTINUITY (DAY 1)

QUESTION: In plain old words in English, what *should* it mean to say

the function $f(x)$ is continuous at $x = a$?

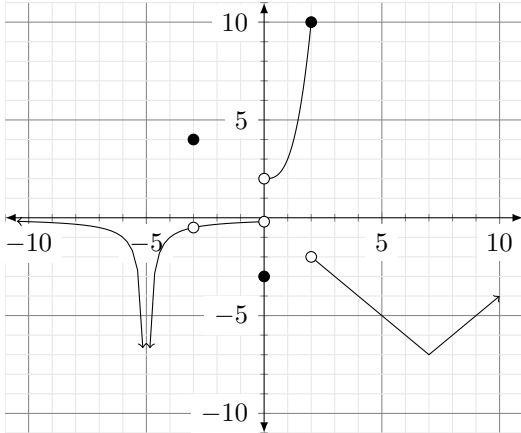
On the axes below, draw some pictures of graphs that are NOT continuous at some point and label that point with the x -value a . Succinctly describe why it's not continuous.



DEFINITION: A function $f(x)$ is continuous at the number $x = a$ if

PRACTICE PROBLEMS: For each function below, state the numbers for which $f(x)$ is continuous and the numbers for which $f(x)$ is discontinuous. For each point of discontinuity, explain why it is discontinuous.

1. $f(x)$ is graphed below. Assume arrows indicate the function continues in that general direction.

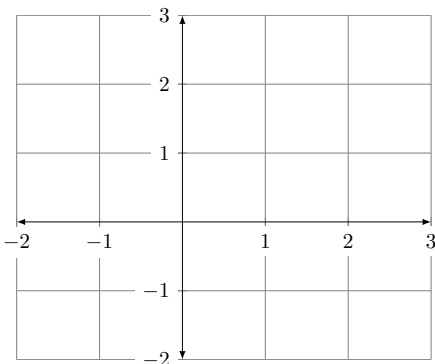


(a) continuous?

(b) discontinuous and why?

$$2. g(x) = \begin{cases} \cos x & x < 0 \\ 2 & x = 0 \\ 1 - x^2 & 0 < x \leq 1 \\ x - 1 & 1 < x \end{cases}$$

(a) continuous?



(b) discontinuous and why?

$$3. h(x) = \frac{x^3 - 8}{x^2 - 4}$$

(a) continuous?

(b) discontinuous and why?