

## STEP Functions

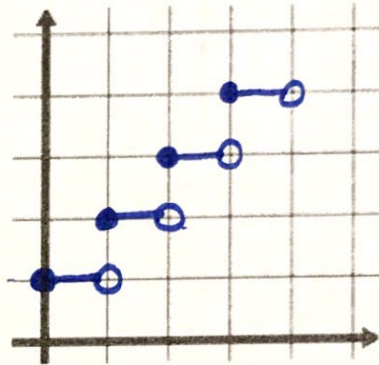
What is a step function??

A piecewise function that is defined by a constant value over each part of its domain. Its graph represents a set of stairs.

### Example 1

Graph the following step function.

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



- What is the domain of the function?

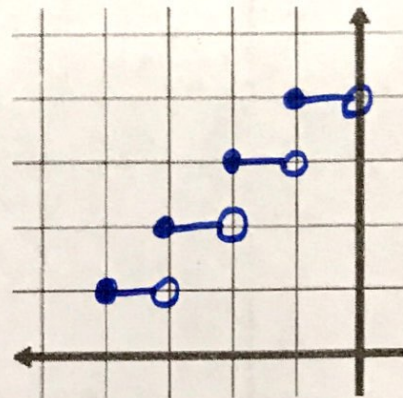
X-values (Left to Right)  $[0, 4)$

- What is the range of the function?

Y-values (Bottom to Top)  $\{1, 2, 3, 4\}$

### You Try!!

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



- What is the domain of the function?

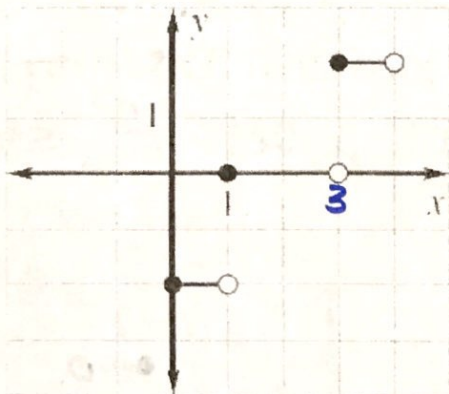
$[-4, 0)$

- What is the range of the function?

$\{1, 2, 3, 4\}$

Write a piecewise function for each step function shown.  
Then give the domain and range of the function.

1)

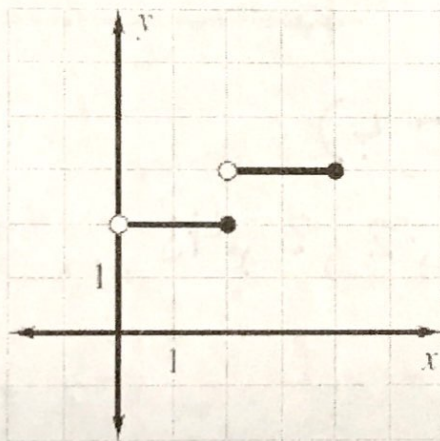


$$f(x) = \begin{cases} -2, & \text{if } 0 \leq x < 1 \\ 0, & \text{if } 1 \leq x < 3 \\ 2, & \text{if } 3 \leq x < 4 \end{cases}$$

Domain:  $[0, 4)$

Range:  $\{-2, 0, 2\}$

2)

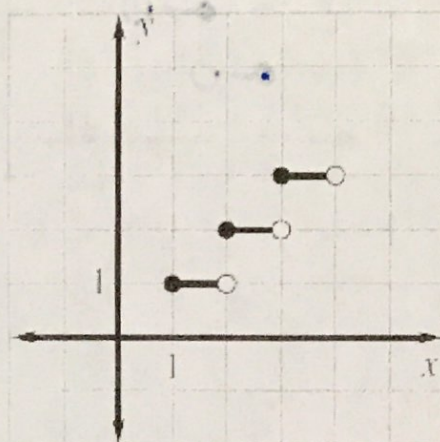


$$f(x) = \begin{cases} 2, & \text{if } 0 < x \leq 2 \\ 3, & \text{if } 2 < x \leq 4 \end{cases}$$

Domain:  $(0, 4]$

Range:  $\{2, 3\}$

3)



$$f(x) = \begin{cases} 1, & \text{if } 1 \leq x < 2 \\ 2, & \text{if } 2 \leq x < 3 \\ 3, & \text{if } 3 \leq x < 4 \end{cases}$$

Domain:  $[1, 4)$

Range:  $\{1, 2, 3\}$