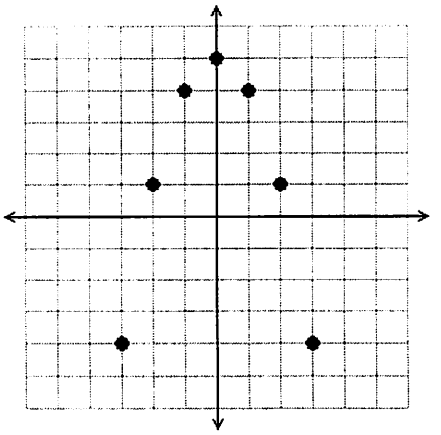
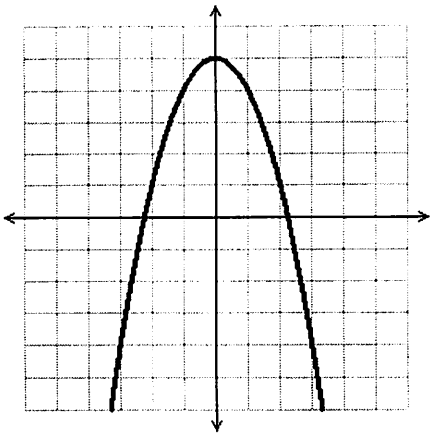
Unit 3 Intro to Functions **Day _____**
Day 6 Domain and Range

I can . . .

. . . given the domain of a function, determine the range of the function.

What is the difference between . . .





A ***roster*** is a list of the elements in a set, separated by commas and surrounded by French curly braces.

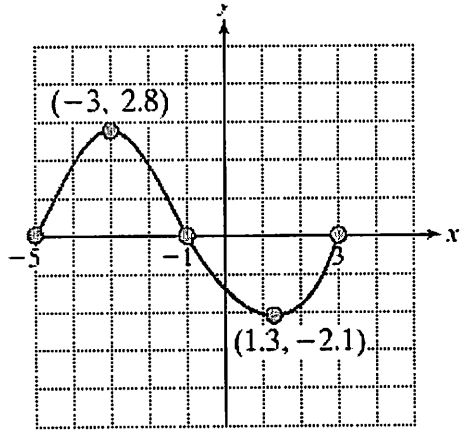
{2, 3, 4, 5, 6} is a roster for the set of integers from 2 to 6, inclusive.

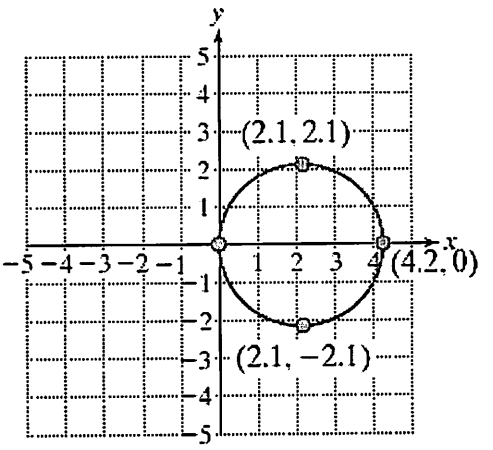
Set-builder notation is a mathematical shorthand for precisely stating all numbers of a specific set that possess a specific property.

The set $\{x \mid x > 0\}$ is read aloud, "the set of all x such that x is greater than 0."

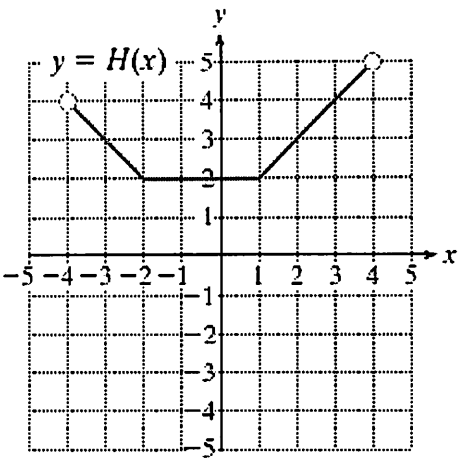
EXAMPLES

Find the domain and range of the relations.





The graph of $y = H(x)$ is given.



a. Find $H(2)$. _____

b. For what value(s) of x is $H(x) = 3$? _____

c. Write the domain and range of g.

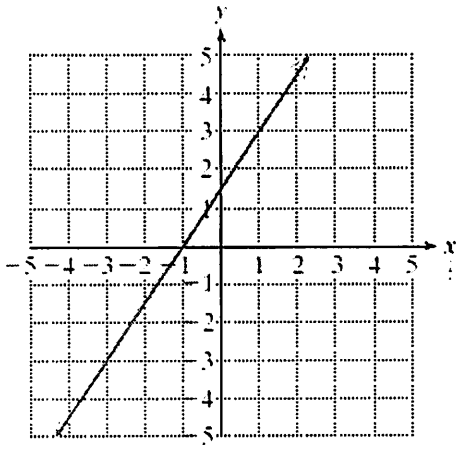
d. Determine the domain for which the function is increasing.

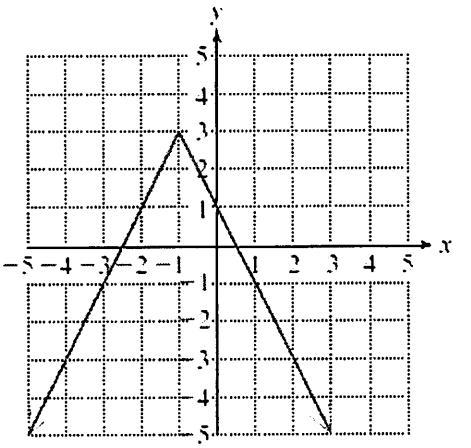
e. Determine the domain for which the function is decreasing.

f. Determine the domain for which the function is constant.

I THINK I GOT IT?

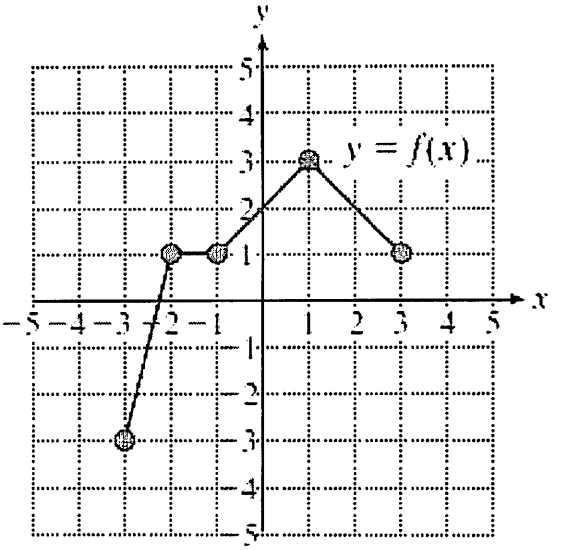
1. Write the domain and range of the relations in set builder notation and interval notation.





I GOT IT!

2. The graph of $y = f(x)$ is given.



   a. Find $f(-3)$. _____

   b. For what value(s) of x is $f(x) = 2$? _____

   c. Write the domain of f.

   d. Write the range of f.

   e. Determine the domain for which the function is constant.

ANSWERS: 1) Line D: $\{x \mid -\infty < x < \infty\}$; $(-\infty, \infty)$ R: $\{f(x) \mid -\infty < x < \infty\}$; $(-\infty, \infty)$
Absolute Value D: $\{x \mid -\infty < x < \infty\}$; $(-\infty, \infty)$ R: $\{f(x) \mid -\infty < x \leq 3\}$; $(-\infty, 3)$
2) a. $f(-3) = -3$ b. $x = 0, 2$ c. D: $\{x \mid -3 \leq x \leq 3\}$; $[-3, 3]$ d. $\{f(x) \mid -3 \leq x \leq 3\}$; $[-3, 3]$
e. D: $\{x \mid -2 \leq x \leq -1\}$; $[-2, -1]$

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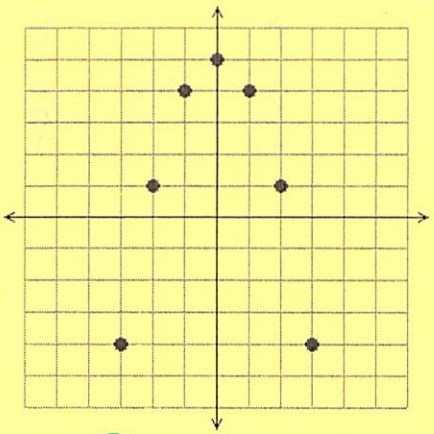
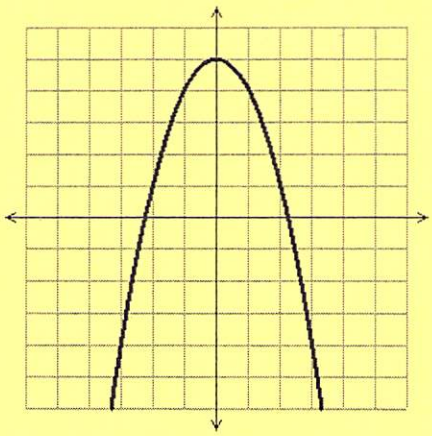


Discrete

Domain: $\{-3, -2, -1, 0, 1, 2, 3\}$

Range: $\{-4, 1, 4, 5\}$



Continuous

Domain $\{x \mid -\infty < x < \infty\}$

Range $\{y \mid -\infty < x \leq 5\}$

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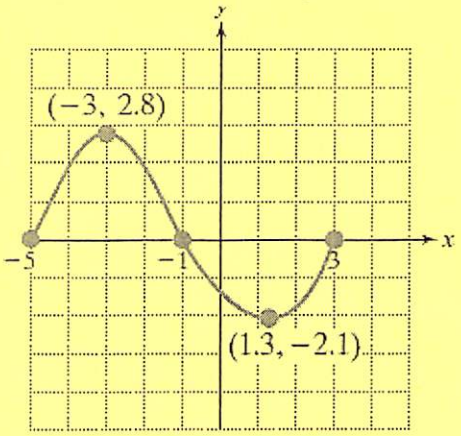
Set-builder notation is a mathematical shorthand for precisely stating all numbers of a specific set that possess a specific property.

The set $\{x \mid x > 0\}$ is read aloud, "the set of all x such that x is greater than 0."

EXAMPLES

Find the domain and range of the relations.

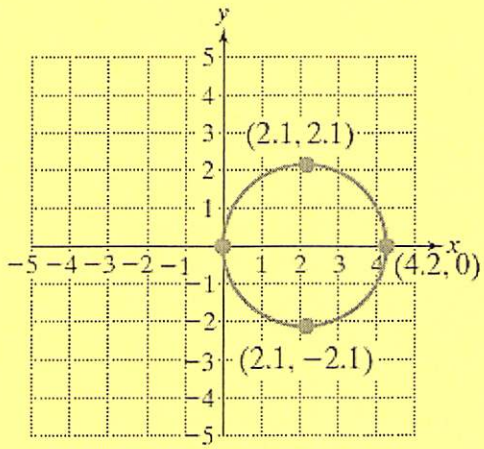


Domain: $-5 \leq x \leq 3$

$[-5, 3]$

Range: $[-2.1, 2.8]$

$-2.1 \leq y \leq 2.8$



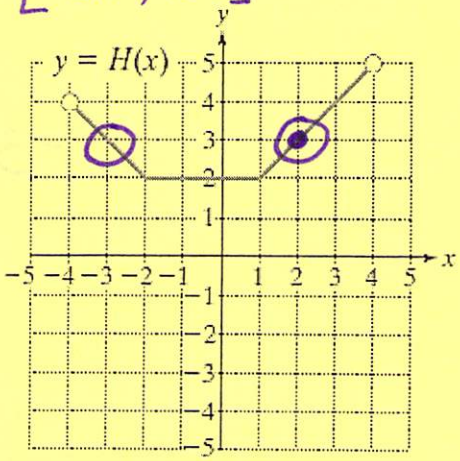
Domain: $0 \leq x \leq 4.2$

$[0, 4.2]$

Range: $-2.1 \leq y \leq 2.1$

$[-2.1, 2.1]$

The graph of $y = H(x)$ is given.



a. Find $H(2)$. 3

b. For what value(s) of x is $H(x) = 3$? 2 and −3

c. Write the domain and range of H

Domain: $-4 < x < 4$

$(-4, 4)$

Range: $2 \leq y < 5$

$[2, 5)$

d. Determine the domain for which the function is increasing.

$1 \leq x < 4$

$[1, 4)$

e. Determine the domain for which the function is decreasing.

$-4 < x \leq -2$

$(-4, -2]$

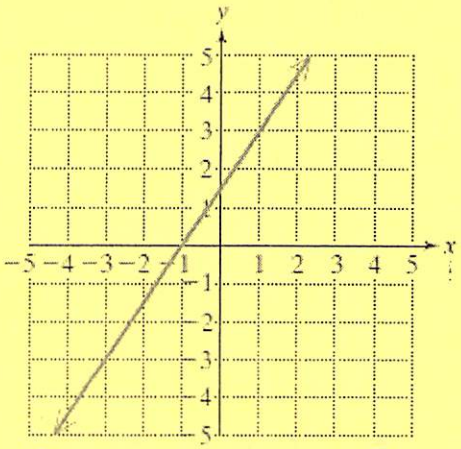
f. Determine the domain for which the function is constant.

$[-2, 1]$

$-2 \leq x \leq 1$

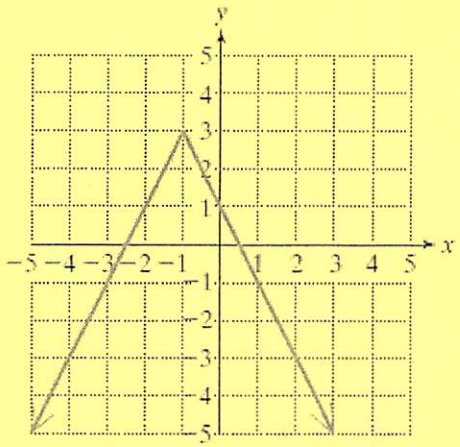
I THINK I GOT IT?

1. Write the domain and range of the relations in set builder notation and interval notation.



Domain: All Reals
$(-\infty, \infty)$

Range: All Reals
$(-\infty, \infty)$

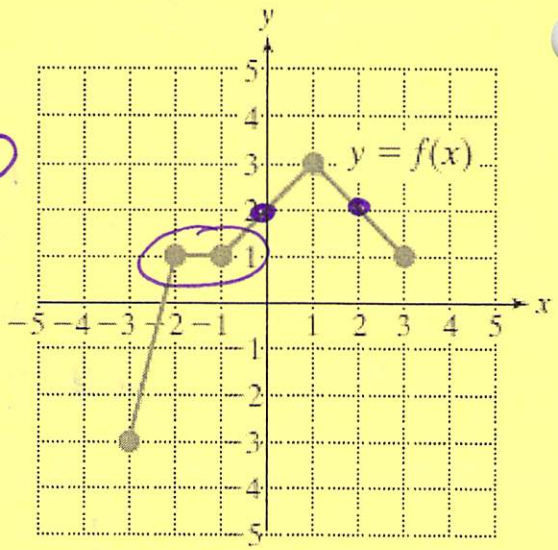


Domain: All Reals
$(-\infty, \infty)$

Range: $y \leq 3$
$(-\infty, 3]$

I GOT IT!

2. The graph of $y = f(x)$ is given.



a. Find $f(-3)$. -3

b. For what value(s) of x is $f(x) = 2$? 2 and 0
$y = 2$

c. Write the domain of f.
$-3 \leq x \leq 3$
$[-3, 3]$

d. Write the range of f.
$-3 \leq y \leq 3$
$[-3, 3]$

e. Determine the domain for which the function is constant.
$-2 \leq x \leq -1$
$[-2, -1]$

ANSWERS: 1) Line D: $\{x \mid -\infty < x < \infty\}$; $(-\infty, \infty)$ R: $\{f(x) \mid -\infty < x < \infty\}$; $(-\infty, \infty)$
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