

Algebra RH

Essential Question: How do we graph linear relationships with restricted domains?

Do Now: In a local convenient store, rolls of paper towels sell for \$1.50 each. Due to a recent shortage, the store is only allowing customers to purchase up to 5 rolls. The function rule that describes the relationship between the number of rolls of paper towels purchased (x) and the total cost (y) is $y = 1.50x$.

Create a table of values for this function rule. Before choosing your input values (x), think about the context of the situation. What numbers should x represent?

X Number of Rolls	Y Total Cost
0	0
1	1.50
2	3
3	4.50
4	6
5	7.50



Think about this...

Does this linear function have a restricted domain?

Does the linear function have a restricted range?

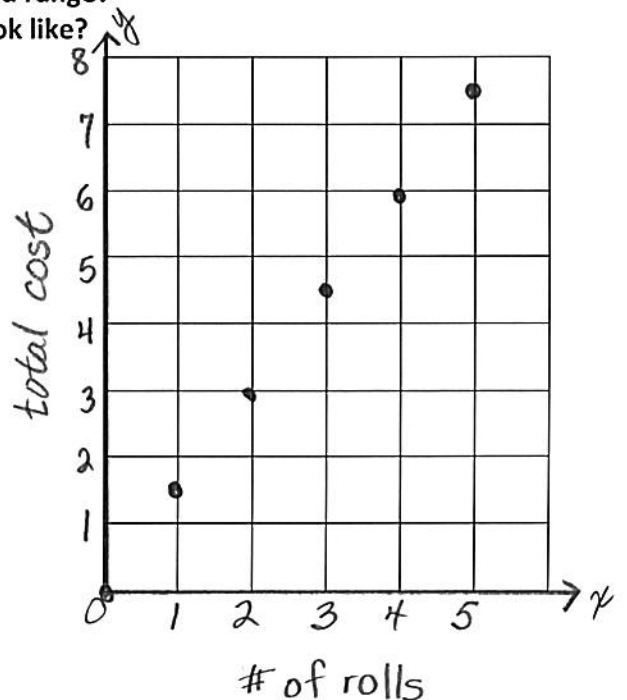
What does the graph of this function look like?

Domain:

\uparrow
x-values
 $\{0, 1, 2, 3, 4, 5\}$

Range:

\uparrow
y-values
 $\{0, 1.50, 3, 4.50, 6, 7.50\}$

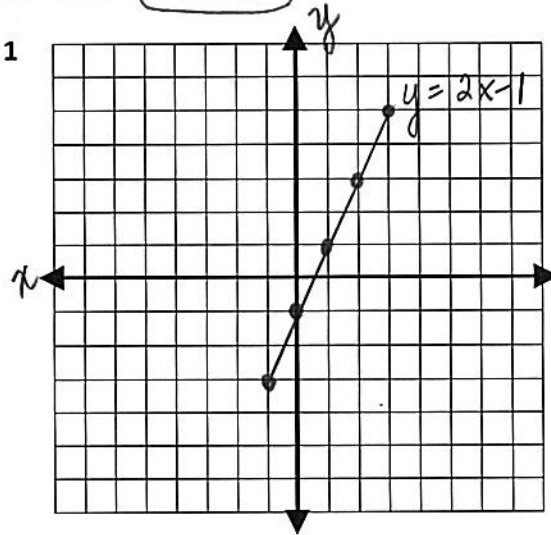


Graphing Linear Functions with Restricted Domains

1. Graph the following linear function using the domain $-1 \leq x \leq 3$ where x is a real number.

x	y
-1	-3
0	-1
1	1
2	3
3	5

$$y = 2x - 1$$



Represent the range of the function using an inequality statement and interval notation.

Inequality Statement: $-3 \leq y \leq 5$

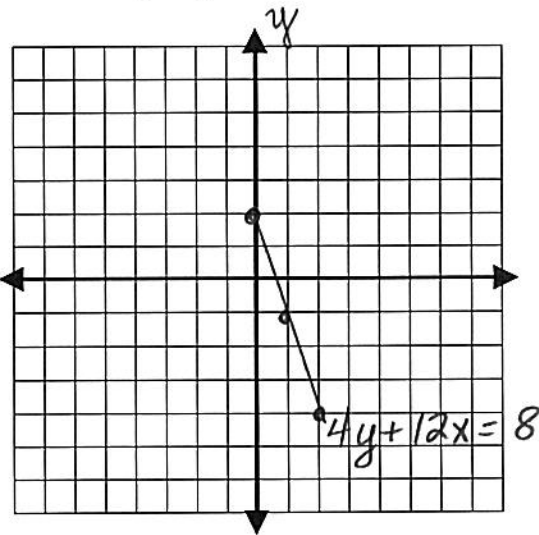
Interval Notation: $[-3, 5]$

2. Graph the following linear function using the domain $0 \leq x \leq 2$ where x is a real number.

$$4y + 12x = 8 \longrightarrow 4y + 12x = 8$$

x	y
0	2
1	-1
2	-4

$$y = -3x + 2$$



Represent the range of the function using an inequality statement and interval notation.

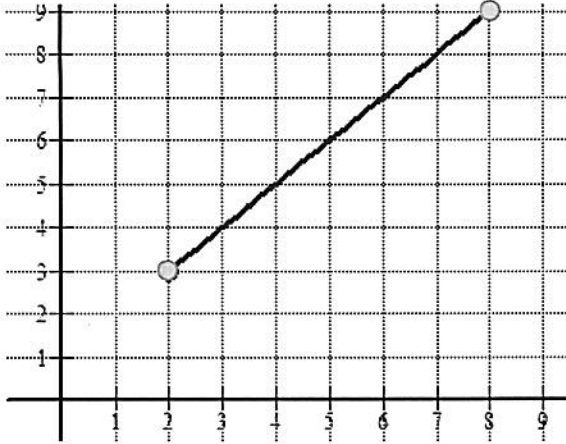
Inequality Statement: $-4 \leq y \leq 2$

Interval Notation: $[-4, 2]$

Defining the Domain and Range from a Graph

Consider the linear functions graphed below. Define the **domain** and **range** of the function using an inequality statement and interval notation.

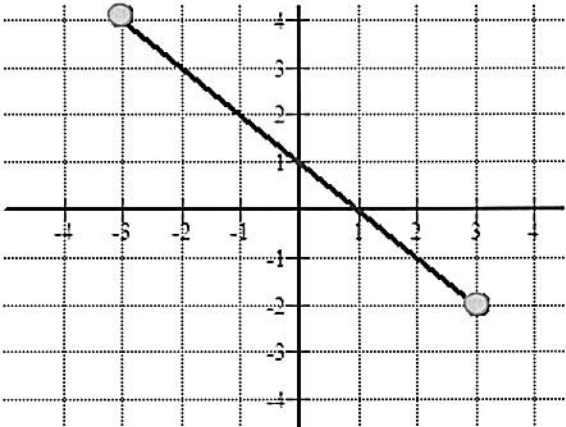
3.



Domain:
(x-values) $2 \leq x \leq 8$
 $[2, 8]$

Range:
(y-values) $3 \leq y \leq 9$
 $[3, 9]$

4.



Domain: $-3 \leq x \leq 3$
 $[-3, 3]$

Range: $-2 \leq y \leq 4$
 $[-2, 4]$

The Take Away

Linear functions with restricted domains have restricted ranges.
The domains and ranges of the functions can be defined using an inequality statement or interval notation.