**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
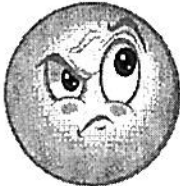
Think about this...
Does this linear function have a restricted domain?
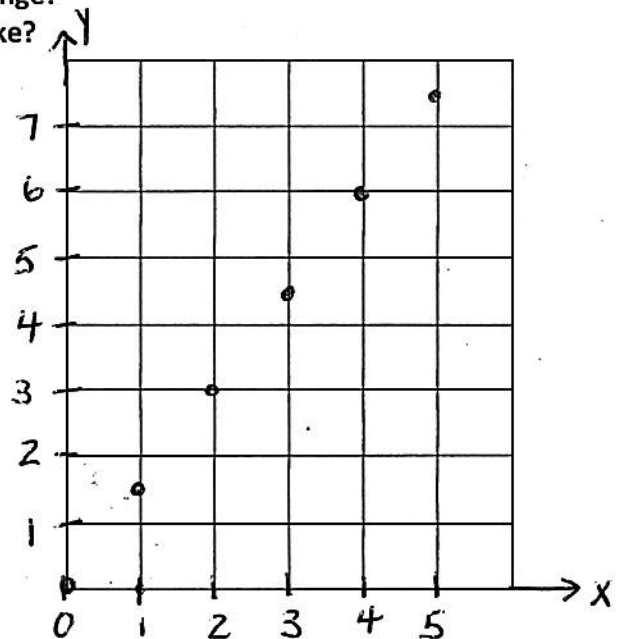**Does the linear function have a restricted range?**
What does the graph of this function look like?

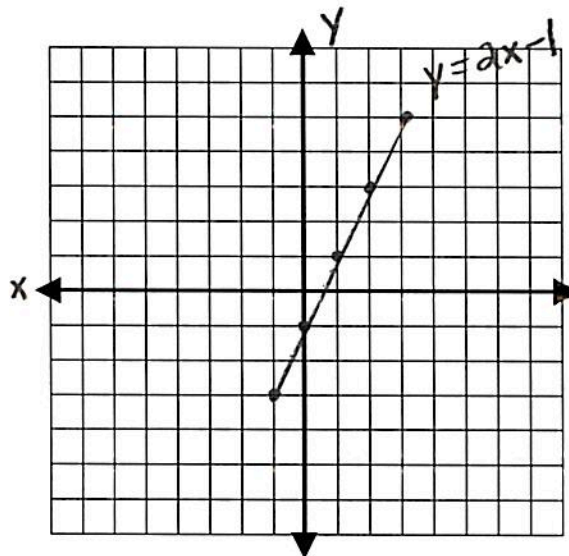Domain: $\{0,1,2,3,4,5\}$

Range: $\{0, 1.5, 3, 4.5, 6, 7.5\}$

Graphing Linear Functions with Restricted Domains

begin ↙
— end

1. Graph the following linear function using the domain **[-1, 3]** where x is a real number.

y = 2x − 1

x	y
−1	−3
0	−1
1	1
2	3
3	5

y = 2x−1

← y-value

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

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

Interval Notation: $[-3, 5]$

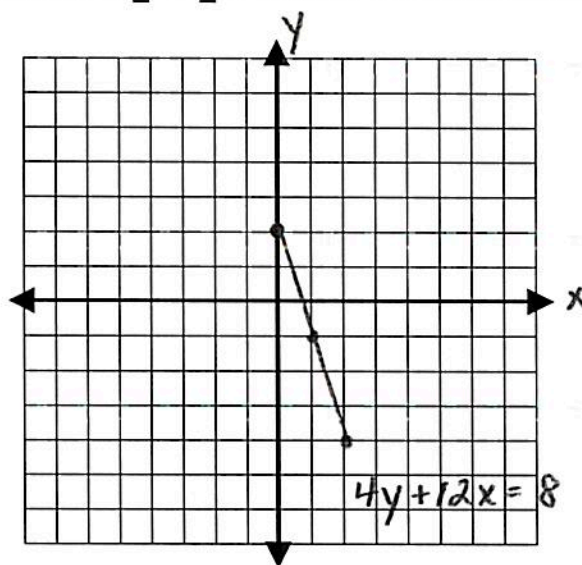2. Graph the following linear function using the domain **0 ≤ x ≤ 2** where x is a real number.

4y + 12x = 8

x	y
0	2
1	−1
2	−4

$4y + 12x = 8$

$\dfrac{4y}{4} = \dfrac{-12x}{4} + \dfrac{8}{4}$

$y = -3x + 2$

4y + 12x = 8

Represent the **range** of the function using an inequality statement and interval notation.
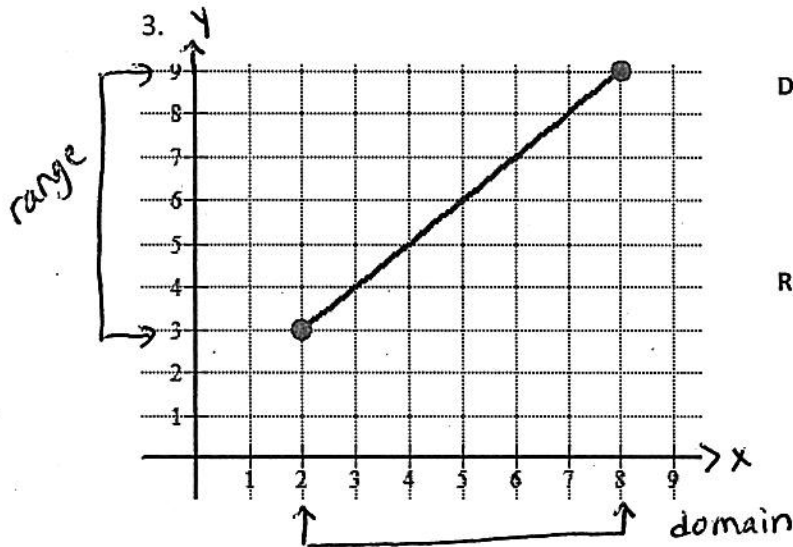
Inequality Statement: $-4 \le y \le 2$

Interval Notation: $[-4, 2]$

* must be written least → greatest
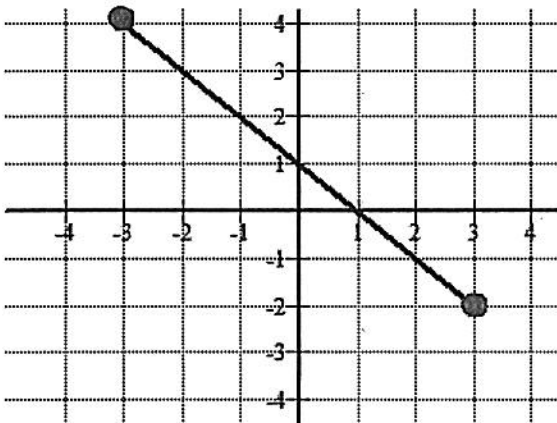
Defining the Domain and Range from a Graph

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

3.

x value

Domain:

$$2 \leq x \leq 8$$
$$[2,8]$$

y value

Range:

$$3 \leq y \leq 9$$
$$[3,9]$$

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.