

### Identifying Key Features of Linear a Graph

**EQ:** How can maximum and minimum values of a function be applied to a real-world context?

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

Nov 6-4:51 PM

### Characteristics of Graphs...

- x-intercept (x, 0)    y-intercept (0, y)
- Intervals of increasing and decreasing - use x-values only

Read the graph from left to right

line goes up: increasing / line goes down: decreasing / line horizontal: constant

Oct 12-2:37 PM

- A graph is continuous over an interval if it has no breaks.
- Intervals of positive and negative: positive when above the x-axis / negative when below the x-axis
- Extrema (minimum or maximum points):
  - A relative minimum is the y-value (output) of the point that is the lowest
  - A relative maximum is the y-value (output) of the point that is the highest

Oct 12-2:37 PM

### 6. Domain & Range:

Domain are all the possible x-values of the function.  
Range are all the possible y-values of the function.

There are many ways to represent the domain and range of the function. We will be using interval notation and inequality notation.

Oct 12-2:37 PM

### Inequality Notation

Less than <    Greater Than >    Less than or equal to ≤  
 Greater than or equal to ≥

When there is no definite starting or ending point the domain or range is all real numbers or  $\mathbb{R}$ .

Oct 12-2:37 PM

### Interval Notation

Interval notation uses parenthesis and brackets to represent the values of the function.

Parenthesis	Brackets
(    )	[    ]
< or >	≤ or ≥
Does Not Include Values No definite starting or ending point	Does Include Value Definite starting and/or ending point
When using the infinity symbol ( $\infty$ ), always use parenthesis	

**Interval Notation**  
 Domain: [-4, 5]  
 Range: [1, 4]

*Smaller value on the left!*

**Inequality Notation**  
 Domain:  $-4 \leq x \leq 5$   
 Range:  $1 \leq y \leq 4$

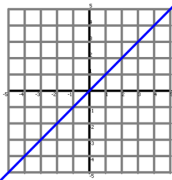
Oct 12-2:37 PM

7. **End Behavior** - as  $x$  approaches  $-\infty$ ,  $\infty$ , or any given number, what  $f(x)$  approaches (also  $-\infty, \infty$ , or number)

Oct 12-2:37 PM

**LINEAR FUNCTIONS**

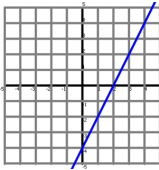
**PARENT FUNCTION**  
 $f(x) = x$



x-intercept: (____, ____)	y-intercept: (____, ____)
increasing: positive:	decreasing: negative:
relative maximum:	relative minimum:
domain:	range:
asymptote:	
End behavior:	As $x \rightarrow -\infty$ , $f(x) \rightarrow$ As $x \rightarrow \infty$ , $f(x) \rightarrow$

**SLOPE-INTERCEPT FORM:  $f(x) = mx + b$**

**EXAMPLE 1**

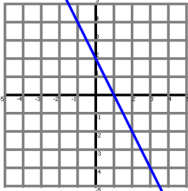


x-intercept: (____, ____)	y-intercept: (____, ____)
increasing: positive:	decreasing: negative:
relative maximum:	relative minimum:
domain:	range:
asymptote:	
End behavior:	As $x \rightarrow -\infty$ , $f(x) \rightarrow$ As $x \rightarrow \infty$ , $f(x) \rightarrow$

Oct 17-8:36 AM

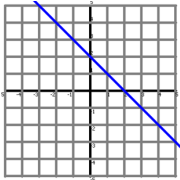
**LINEAR FUNCTIONS**

**EXAMPLE 2**



x-intercept: (____, ____)	y-intercept: (____, ____)
increasing: positive:	decreasing: negative:
relative maximum:	relative minimum:
domain:	range:
asymptote:	
End behavior:	As $x \rightarrow -\infty$ , $f(x) \rightarrow$ As $x \rightarrow \infty$ , $f(x) \rightarrow$

**YOU TRY:**



x-intercept: (____, ____)	y-intercept: (____, ____)
increasing: positive:	decreasing: negative:
relative maximum:	relative minimum:
domain:	range:
asymptote:	
End behavior:	As $x \rightarrow -\infty$ , $f(x) \rightarrow$ As $x \rightarrow \infty$ , $f(x) \rightarrow$

Oct 17-8:36 AM



**COMPLETE PRACTICE HANDOUT**

Oct 17-10:11 AM