What information is given to us when we find the Domain and Range of a Function?

Week 7, Lesson 1
1. Warm Up
2. Notes
3. ICA

Warm-Up

Solve each equation for y

1. \[ \frac{y}{x} = \frac{2}{3} \]
   \[ y = \frac{2}{3}x \]

2. \[ 9 + x = 14 \]
   \[ y = 14 - x \]
   \[ y = 4 - x \]

3. \[ 2x + y = 10 \]
   \[ y = 10 - 2x \]
   \[ y = \frac{10 - 2x}{3} \]

4. \[ 3x + 2y = 15 \]
   \[ y = \frac{15 - 3x}{2} \]
   \[ y = \frac{15}{2} - \frac{3}{2}x \]

Calculators and Log in

Notes

Functions (F-IF.1)

What are other algebraic names for input and output?

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>y</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>f(x)</td>
</tr>
</tbody>
</table>

**Function:** A relationship where each input has exactly one output.

**Examples:**

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
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<tr>
<td>3</td>
<td>30</td>
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<tr>
<td>4</td>
<td>40</td>
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</table>

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>( x_2 )</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Summary:
### Decide if each is a Function or Not a Function

<table>
<thead>
<tr>
<th></th>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1</td>
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<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>2</td>
<td>-2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

#### 3.

### Domain and Range (F-IF.1)

**Domain:** The "x" values in a function

**Range:** The "y" values in a function

In a function, the INPUT (x) can have only 1 Output (y)

If there are any repeats in the INPUT (x) then it is **NOT** a Function

If the Input (x) repeats it is **NOT** a function

If the Output (y) repeats it is still a function

**Is this a function?**

\[ \{(3,5),(2,-2),(3,6)\} \]

<table>
<thead>
<tr>
<th>What is the DOMAIN?</th>
<th>What is the RANGE?</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 repeat 2 3</td>
<td>5 -2 6</td>
</tr>
</tbody>
</table>

Notes: Is this a function?
### Are these Functions?

<table>
<thead>
<tr>
<th>Domain</th>
<th>Range</th>
<th>Domain</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>{(4,6),(7,−2),(−1,6)}</td>
<td></td>
<td>{(2,−1),(4,−1),(5,4),(3,8)}</td>
<td></td>
</tr>
<tr>
<td>{(−3,2),(7,−2),(−3,1),(4,10)}</td>
<td></td>
<td></td>
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</tbody>
</table>

### Summary:

**Domain and Range (F-IF.1)**

On a coordinate plane, we can see whether the graph is a function or not.

**Vertical Line Test** Place a Vertical Line ANYWHERE on the graph. A Function only crosses 1 point at a time on the graph.
Are these Functions?

1. Is it a function? Explain why or why not (in words).

2. \( \{(5,3),(-4,-2),(-4,3),(5,1)\} \)

3. \( \{(5,5),(-4,-2),(2,6),(5,1)\} \)

4. \[
\begin{array}{c|c}
  x & f(x) \\
  \hline
  -2 & 5 \\
  -2 & 6 \\
  10 & 14 \\
  31 & -3 \\
  42 & 25 \\
\end{array}
\]

5. \[
\begin{array}{c|c}
  x & f(x) \\
  \hline
  -2 & -3 \\
  -1 & -1 \\
  0 & 1 \\
  1 & 3 \\
  2 & 5 \\
\end{array}
\]
What information is given to us when we find the Domain and Range of a Function?

Is this a function? Why or Why Not?

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Is this a function? Why or Why Not?

Left Side...

Right Side...

What information is given to us when we find the Domain and Range of a Function?

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Is this a function? Why or Why Not?
**Essential Question:**

- How do we manipulate an equation into $y=mx+b$ form?
- How do we graph in $y=mx+b$ form?

**Week 7, Lesson 2**

1. Warm Up
2. Notes
3. ICA
4. Homework

**Slope Intercept Form**

- **Slope and Intercept Form**
  
  $y=mx+b$

**Warm-Up**

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

**Is it a Function?**

1. Input
2. Output
3. $(1, 2), (3, 1), (5, 1)$

**Solve for $y$**

$my - c = r$

**Notes**

- Summary:
  
  $y=2x+0$

- What numbers make this statement true?
  
<table>
<thead>
<tr>
<th>$X$</th>
<th>$Y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

- The $x$ and $y$ coordinates $(x, y)$ that make the equation true are points on the line.

- There is a shortcut to graphing equations and it is essential to algebra.

- Consider our last equation:
  
  $y=2x+0$

  - $m =$
  - $b =$
Lines and \( y = mx + b \)

**SLOPE**

\[ \frac{\text{Rise}}{\text{Run}} \text{ or } \frac{\text{Rise}}{\text{Right}} \]

- **Rise**: Vertical distance a point moves
  - Positive rise moves UP
  - Negative rise moves DOWN

- **Run/Right**: Horizontal distance a point moves

- **Y-Intercept**: The point on the line that crosses the y-axis

---

**ICA:**

Decide the directions the slope tells us to move

**Example:**

\[
\text{Slope} = \frac{3}{2} \quad \text{Rise of 3 Up} \quad \frac{2}{2} \quad \text{Run of 2 Right}
\]

1. Slope = \( \frac{1}{2} \)
2. Slope = 2
3. Slope = 5
4. Slope = \( -\frac{2}{3} \)  
   **Hint**: move the "-" to the numerator
5. Slope = -3
6. Slope = \( -\frac{4}{3} \)
Graphing a Line

1. Plot the Y-Intercept
2. Use the slope to find at least 2 more points

You must have at least 3 points total to confirm your line is correct

Graph Each Line

\[ y = 2x - 1 \]
\[ y = 3x + 2 \]
Graph Each Equation and Identify the Slope and Y-Intercept

1. \( y = 2x + 2 \)
2. \( y = x - 4 \)
3. \( y = \frac{1}{2}x - 1 \)
4. \( y = -3x + 4 \)
5. \( y = -x + 2 \)
6. \( y = \frac{1}{3}x + 5 \)
7. \( y = -\frac{2}{3}x + 3 \)
8. \( y = -\frac{1}{2}x - 1 \)
9. \( y = -2x + 5 \)
10. \( y = -3x + 4 \)
11. \( y = -\frac{1}{4}x + 2 \)
12. \( y = 3 \)
Write an equation in \( y=mx+b \) form, then graph on the coordinate plane.

Mr. Henderson teaches yoga classes and charges a sign up fee of $20. He also charges a fee of $15 per month to take his classes. Write an equation to represent this situation, then make an Input/Output chart for the first 4 months of class.

\[
\text{Left Side: } \quad y = 3x - 6
\]

In \( y=mx+b \) form, what do the "\( m \)" and "\( b \)" tell us about our line?

Solve for \( y \)

What is the Slope:

What is the \( y \)-intercept:
How do I take two points on a line and find the slope?

**Finding Slope**

|------------------|------------|----------|--------|-------------|

**Warm-Up**

What is the slope and y-intercept of each line?

1. $y = 2x + 5$
2. $y = -23x + 4$
3. $y = x - 1$
4. $y - 3x = 10$
Find the Slope of a Line

Finding the Slope with Two Points

\[ m = \frac{y_2 - y_1}{x_2 - x_1} \]

Point 1: \((1, 0)\)
Point 2: \((5, 4)\)

\[ m = \frac{4 - 0}{5 - 1} = \frac{4}{4} = 1 \]

Think of slope as \( \frac{\text{Rise}}{\text{Run}} \)

Always include the sign and the parenthesis ( )

Using the points given, find the slope of each pair

1. \((1, 1)\) and \((2, 7)\)
2. \((4, 7)\) and \((6, 4)\)
3. \((-3, 0)\) and \((-6, 7)\)
4. \((19, -2)\) and \((9, 10)\)

\(5. \) \((0, 0)\) and \((4, 2)\)

\(6. \) \((-3, 2)\) and \((-1, -1)\)
ICA:

Using the points given, find the slope of each pair

1. \((-3, -2)\) and \((-1, 0)\)
2. \((-5, -8)\) and \((1, 2)\)
3. \((5, -4)\) and \((1, -8)\)
4. \((2, -3)\) and \((-10, -7)\)
5. \((-3, -2)\) and \((-1, 0)\)
6. \((-3, -2)\) and \((-1, 0)\)
7. \((-3, -2)\) and \((-1, 0)\)
8. \((-3, -2)\) and \((-1, 0)\)
9. \((-3, -2)\) and \((-1, 0)\)
10. \((-3, -2)\) and \((-1, 0)\)
How do I graph real world problems and scenarios?

Week 7, Lesson 4

1. Warm Up
2. Notes
3. ICA
4. Homework

Warm-Up:

Solve for "y" then, Graph the equation.

\[ \frac{1}{2} y - 5x = 10 \]

Modeling Real World Situations

Mike is going to purchase a membership for LA Fitness just for the summer. It costs him $20 to sign up and $20 a month. Mike is only going to use the membership from May to August.

Write the equation that models this situation.

\[ y = mx + b \]

Graph the equation that models this situation.
Mr. Pieroni loves to wear vests. He already has 13 vests in his collection. This is clearly not enough vests for Mr. Pieroni. So, Mr. Pieroni decides to buy 5 vests per week for the rest of his life. Write the equation that models this scenario in y=mx+b form.

Graph the equation on your calculator.
Alex goes sky diving. He pulls the parachute at a height of 2500 feet above ground. 35 seconds later he is at a height of 2115 feet.

What is his rate of change in height?

Write an equation to model the scenario.

Identify the slope and y-intercept and describe their meaning in the problem.

ICA:

Mariah goes for a bike ride and stops every once in a while to record how far she has gone. The data is shown below.

<table>
<thead>
<tr>
<th>Hours</th>
<th>Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>6</td>
<td>36</td>
</tr>
</tbody>
</table>

1. Graph the data.

2. What is the y-intercept?

What is the rate of change?

3. 
How do we find the slope when we are given 2 points on a line?

Left Side...

Right Side...

Closure

Homework

HW