Warm Up
Find the slope from the graphs and tables below.

1.) \( m = 4 \)

2.) \( m = \frac{1}{4} \)

3.) \( m = \frac{2}{3} \)

4.) \( m = -\frac{4}{3} \)
WARM-UP!!!

REVIEW

Translate the following expressions, equations, & inequalities:

1. “The product of a number and 7”
   \[ 7n \]

2. “Nine subtracted from twice a number”
   \[ 2x - 9 \]

3. “One less than the quotient of a number and -5.”
   \[ \frac{n}{-5} - 1 \]

4. “Three times the sum of a number and 10 is 24.”
   \[ 3(n + 10) = 24 \]

5. “The difference of twice a number and 3 is 21.”
   \[ 2n - 3 = 21 \]

6. “One-third of a number is 8 less than the number itself.”
   \[ \frac{1}{3}n = n - 8 \]

7. “x is at most 6”
   \[ x \leq 6 \]

8. “You must be at least 18 years old to vote”
   \[ x \geq 18 \]
How can you find the slope without a graph or table?

Slope Formula:

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

*(It is important to remember to simplify your answer!)*

If you have a table, pick two points!
Find the slope between each pair of points.

1.) Write the points.

2.) Label \((x_1, y_1)\) and \((x_2, y_2)\)

3.) Write the formula.

4.) Plug - In (*Remember the signs)

5.) Simplify
The slope formula is used to find the slope between two points \((x_1, y_1)\) and \((x_2, y_2)\).

Formula: 

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

*It is important to remember to SIMPLIFY your answer!*

<table>
<thead>
<tr>
<th>(x_1)</th>
<th>(y_1)</th>
<th>(x_2)</th>
<th>(y_2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ((1, 1)) and ((4, 3))</td>
<td>(m = \frac{3 - 1}{4 - 1} = \frac{2}{3})</td>
<td></td>
<td></td>
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<tr>
<td>2. ((-2, 4)) and ((10, -2))</td>
<td>(m = \frac{-2 - 4}{10 - (-2)} = \frac{-6}{12} = \frac{-1}{2})</td>
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<tr>
<td></td>
<td>5. ((5, 9)) and ((3, 9))</td>
<td>6. ((-7, 8)) and ((-7, 5))</td>
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<tr>
<td></td>
<td>(m = \frac{9-9}{3-5} = \frac{0}{-2} = 0)</td>
<td>(m = \frac{5-8}{-7-(-7)} = \frac{3}{0})</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-m = 0)</td>
<td>(m = \text{undefined})</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>y's are same!</strong></td>
<td><strong>x's are same!</strong></td>
<td></td>
</tr>
</tbody>
</table>

9. \((5, 6)\) and \((6, 5)\)

\[ m = \frac{5-6}{6-5} = \frac{-1}{1} = -1 \]

\[ m = -1 \]

10. \((9, -4)\) and \((1, -4)\)

\[ m = \frac{9-1}{-4-(-4)} = \frac{0}{0}\]

\[ m = 0 \]
Slope Intercept Form

\[ y = mx + b \]

*slope* - always the coefficient paired with the *x*!

*y* - intercept
Ex. 1)
What are the slope and y-intercept of the graph of \( y = 5x + 2 \)?

Plan Ahead:
Is the equation solved for \( y \)？ \((y = \text{ )})?\nIf not then solve for \( y \).

Use slope - intercept form \((y = mx + b)\)

Label the slope and \( y \)-intercept.
Write the equation of a line given the slope and y-intercept.

1. slope = 2; y-intercept = -1
   \[ y = \frac{2}{1}x - 1 \]

2. slope = \(-\frac{3}{5}\); y-intercept = 4
   \[ y = -\frac{3}{5}x + 4 \]

3. slope = -3; y-intercept = 2
   \[ y = -3x + 2 \]

4. slope = -1; y-intercept = 7
   \[ y = -1x + 7 \]

5. slope = \(\frac{1}{4}\); y-intercept = 0
   \[ y = \frac{1}{4}x \]
Standard Form

\[ ax + by = c \]

y is still the most important term
Given equations in standard form, you must convert them to slope-intercept form.

Examples:
1. \(2x + y = 3\)
   \[\begin{align*}
   -a &= -2 \\
   b &= 3
   \end{align*}\]
   \[\begin{align*}
   y &= -2x + 3
   \end{align*}\]

2. \(4x + 5y = -30\)
   \[\begin{align*}
   -4x &= -4x - 30 \\
   5y &= 5
   \end{align*}\]
   \[\begin{align*}
   y &= -\frac{4}{5}x - 6
   \end{align*}\]

Identify the slope and y-intercept.
Identify the slope and y-intercept.
5. $4x - y = 0$

6. $3x - 2y = 14$

\[
\begin{align*}
2x + 3y &= 6 \\
-2x &= -2x + 6 \\
3y &= \frac{-2x + 6}{3} \\
y &= \frac{-2}{3}x + 2
\end{align*}
\]

$6x - 2y = 3$

Identify the slope and y-intercept.
Notebook Practice

Find the slope from each equation.

1.) $3x + 2y = 12$, $m = \_\_\_\_\_\_$  
2.) $y = 4x - 10$, $m = \_\_\_\_\_$

3.) $y = -x + 3$, $m = \_\_\_\_\_$  
4.) $x - y = 12$, $m = \_\_\_\_$

5.) $-6x + 4y = -12$, $m = \_\_\_\_\_$  
6.) $-3x + 2y = 6$, $m = \_\_\_\_$

7.) $y = -6x - 3$, $m = \_\_\_\_\_$  
8.) $x + y = 8$, $m = \_\_\_\_$