Worksheet on Graphing
Review Test Handout, PowerPoint 18
Review test in textbook, Page 201

Quiz on Graphing

Homework: Topic 18, page 195
Test on Unit 2 on Monday
Slope

Slope is rise over run

This chart gives the year and the average time spent by women in a supermarket.

<table>
<thead>
<tr>
<th>Year</th>
<th>Time Spent in Supermarket</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>32</td>
</tr>
<tr>
<td>1996</td>
<td>78.3</td>
</tr>
</tbody>
</table>

\[
\text{average rate of change} = \frac{78.3 - 32}{1996 - 1991} = \frac{46.3}{5} = 9.26 \text{ hours/year}
\]
### Slope – Average Rate of Change

<table>
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<th>Year</th>
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</tr>
</thead>
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<td>32</td>
</tr>
<tr>
<td>1996</td>
<td>78.3</td>
</tr>
</tbody>
</table>

\[
slope = \frac{\text{rise}}{\text{run}}
\]
<table>
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<th>Year</th>
<th>Time Spent</th>
</tr>
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<tbody>
<tr>
<td>1991</td>
<td>32</td>
</tr>
<tr>
<td>1996</td>
<td>78.3</td>
</tr>
</tbody>
</table>

Percent Change = \( \left( \frac{\text{New} - \text{Old}}{\text{Old}} \right) \times 100 \)

\[
\frac{78.3 - 32}{32} = \frac{46.3}{32} = 1.445 \\
= 144.5\% \\
\]
Slope

Slope is rise over run.

\[ m = \frac{\text{Change in } Y}{\text{Change in } X} \]

\[ m = \frac{\text{Change in } Y}{\text{Change in } X} = \frac{Y_1 - Y_0}{X_1 - X_0} \]
Slope

Find the Slope of the line that passes through (6, -2) and (5, 7).

\[ m = \frac{\text{Change in } Y}{\text{Change in } X} = \frac{Y_1 - Y_0}{X_1 - X_0} \]

\[ m = \frac{Y_1 - Y_0}{X_1 - X_0} = \frac{7 - (-2)}{5 - 6} = \frac{9}{-1} = -9 \]

\[ m = \frac{7 - (-2)}{5 - 6} = \frac{9}{-1} = -9 \]

\[ m = \frac{-2 - 7}{6 - 5} = \frac{-9}{1} = -9 \]
Plot the points and verify the slope of -9

Points: (6, -2), (5, 7)

Slope: -9
Slope

Find the Slope of the line that passes through (8, 2) and (4, -12).

\[ m = \frac{\text{Change in } Y}{\text{Change in } X} = \frac{Y_1 - Y_0}{X_1 - X_0} \]

\[ m = \frac{Y_1 - Y_0}{X_1 - X_0} = \frac{-12 - (2)}{4 - 8} = \frac{-14}{-4} = \frac{7}{2} \]

\[ m = \frac{Y_1 - Y_0}{X_1 - X_0} = \frac{7}{2} = 3.5 \]
The slope of the line through points (8, 2) and (4, -12) is:

\[
\frac{-12 - 2}{4 - 8} = \frac{-14}{-4} = 3.5 \quad \text{(not 2)}
\]

The calculation for the slope is correct, but there seems to be a misunderstanding in the interpretation of the result. The slope should be 3.5, not 2.

The calculations for the differences in the y-coordinates and the differences in the x-coordinates are correct:

\[
\frac{2 - (-12)}{8 - 4} = \frac{14}{4} = 3.5
\]

\[
2 - 12 = -10 \quad \text{and} \quad 2 - 12 = -10
\]
Plot the points and verify the slope of 3.5

(8, 2)
(4, -12)
Slope

Find the Slope of the line that passes through \((2, 4)\) and \((2, -5)\).

\[
m = \frac{\text{Change in } Y}{\text{Change in } X} = \frac{Y_1 - Y_0}{X_1 - X_0}
\]

\[
m = \frac{Y_1 - Y_0}{X_1 - X_0} = \frac{-5 - 4}{2 - 2} = \frac{-9}{0} = \text{undefined}
\]

\[
m = \frac{Y_1 - Y_0}{X_1 - X_0} = \text{undefined}
\]
(2, 4) and (2, -5).

\[ x = 2 \]

\[ \frac{-5 - 4}{0} = \frac{-9}{0} \]

Slope is undefined.

\[ y = 6 \]

\[ m = \text{undefined} \]

\[ m = \text{Horizontal} \]

\[ x = 6 \]
\[
\frac{0}{b} = 0
\]

\[
\frac{b}{0} = \text{undefined}
\]

\[
\frac{0}{a} = \text{indeterminate}
\]
Plot the points and verify the slope.

(2, 4)
(2, -5)
Plot the points and verify the slope.

(2, 4)
(2, -5)
Plot the points and verify the slope is 0.

\[
\text{Given points: } (4, -3), (-2, -3)
\]

\[
\text{Slope } m = \frac{-3 - (-3)}{4 - (-2)} = \frac{0}{6} = 0
\]

\[
y = -3
\]
Plot the points and verify the slope is 0.

(4, -3)
(-2, -3)
$Y = mx + b$

$m = \text{slope}; \ b = \text{y-intercept}$

<table>
<thead>
<tr>
<th>$Y = mx + b$</th>
<th>$y = \frac{3}{4}x - 5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$m$</td>
<td></td>
</tr>
<tr>
<td>$b$</td>
<td></td>
</tr>
</tbody>
</table>
\[ Y = mx + b \]

\[ m = \text{slope}; \quad b = \text{y-intercept} \]

<table>
<thead>
<tr>
<th>( Y = mx + b )</th>
<th>( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( m )</td>
<td>( \frac{-3}{4} )</td>
</tr>
<tr>
<td>( b )</td>
<td>( y = -\frac{3}{4}(x) - 5 )</td>
</tr>
</tbody>
</table>

\[ m = \frac{-3}{4} = \frac{\text{rise}}{\text{run}} \]

\[ \text{Change y} \]

\[ \text{Change x} \]

<table>
<thead>
<tr>
<th>( x )</th>
<th>( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-5</td>
</tr>
<tr>
<td>4</td>
<td>-8</td>
</tr>
</tbody>
</table>

\[ x | y \]

\[ -3 - 5 \]
\[ y = \frac{-3}{4} x - 5 \]
\[ y = \frac{-3}{4} x - 5 \]

Points: 
- (4, -8)
- (0, -5)
The equation $y = mx + b$ represents a linear function, where $m$ is the slope and $b$ is the y-intercept.

The table shows:

<table>
<thead>
<tr>
<th>$mx + b$</th>
<th>$y = 4x + 5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$m$</td>
<td>4</td>
</tr>
<tr>
<td>$b$</td>
<td>5</td>
</tr>
</tbody>
</table>

The slope $m$ is calculated as $4$, and the y-intercept is $5$.

The line graph passes through the points $(0, 5)$ and $(1, 9)$.
Solve for y in terms of x

3x + 2y = 6

3x + 2y = 6

2y = 6 - 3x  Subtract 3x from both sides

y = (6 - 3x)/2  Divide both sides by 2

y = \(-\frac{3}{2}\)x + 3  Write in y = mx + b form
Solve for $y$ in terms of $x$

$3x + 2y = 6$

$3x = 6$

$x = 2$

$2y = -3x + 6$

$y = -\frac{3}{2}x + 3$

$0 + 2y = 6$

$2y = 6$

$y = 3$

$y = mx + b$

$y = \left(\frac{4}{5}\right)x - 2$

$(0, 3)$

$(2, 0)$

$(0, 3)$
$3x + 2y = 6$

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

Points:
- (2, 0)
- (0, 3)
Applications of Graphs

- Lawn Mower
- Wages
- Car Rental
- Telephone Plan
Objectives

- Write the equation for a problem situation
- Graph the equation for a problem situation
- Explain x-intercept, y-intercept, and slope in terms of the problem situation
Two girls buy a lawn mower for $400 and plan to charge $8.75 an hour.

Graph the equation. \[ P = 8.75h - 400 \]

\[
\begin{array}{c|c}
\hline
h & P \\
\hline
0 & -400 \\
45.7 & 0 \\
\hline
\end{array}
\]

\[
0 = 8.75h - 400 \\
+ 400 \quad \frac{400}{400} = 8.75 \frac{h}{8.75} \\
\frac{8.75}{8.75} \quad 45.7 = h
\]
$P = 8.75h - 400$

Points:
- $(0, -400)$
- $(45.7, 0)$

Hours:
- 0
- 10
- 20
- 30
- 40
- 50

Profit:
- Fixed Cost
- Variable Cost

Rate:
- $8.75/\text{hr}$
\[ P = 8.75h - 400 \]

At \( h = 102.9 \) hours:

\[ P = 500 \]

\[ 500 = 8.75h - 400 \]

\[ h = \frac{500 + 400}{8.75} \]

\[ h = \frac{900}{8.75} \]

\[ h = 102.9 \text{ hours} \]
Two girls buy a lawn mower for $400 and plan to charge $8.75 an hour.

\[ P = 8.75h - 400 \]

What does the y-intercept mean?

What does the x-intercept mean?

What does the slope mean?
\[ P = 8.75h - 400 \]

How many hours must they work to earn $500?
$P = 8.75h - 400$

$P = 500$

$(102.9, 500)$

$(0, -400)$

$(45.7, 0)$
Two companies, ACME and EMAC, offer very similar jobs. ACME pays $25,000 a year while EMAC pays $10,000 a year plus 10% commission.

\[ W_A = 25,000 \]

\[ W_E = 0.10 S + 10,000 \]

\[ 25,000 = 0.10 S + 10,000 \]

\[ 15,000 = 0.10 S \]

\[ S = 150,000 \]
WE = 0.10S + 10,000

Sales

$10 Commission

10

$10,000

500,000

40,000

WA = 25,000
Two companies, ACME and EMAC, offer very similar jobs. ACME pays $25,000 a year while EMAC pays $10,000 a year plus 10% commission.

When do the two companies pay the same wages?
Two companies, ACME and EMAC, offer very similar jobs. ACME pays $25,000 a year while EMAC pays $10,000 a year plus 10% commission.

What do the y-intercepts mean?
Two companies, ACME and EMAC, offer very similar jobs. ACME pays $25,000 a year while EMAC pays $10,000 a year plus 10% commission.

When does ACME pay more than EMAC?
Two companies, ACME and EMAC, offer very similar jobs. ACME pays $25,000 a year while EMAC pays $10,000 a year plus 10% commission.

What does the slope of each line mean in terms of the problem?
The equation $5x + 3y = 15$ is graphed on a coordinate plane with points marked at $(0, 5)$ and $(3, 0)$. The x-intercept is marked with an 'X' at $(0, 0)$. The graph shows a straight line with these intercepts.
The equation $y = 0.05x + 15$ is graphed on a coordinate plane. Points and calculations around the graph are labeled, including:

- The point $(-300, -100)$
- The point $(0, 15)$
- The point $(300, 0)$

Additionally, the calculations show:

- $0.05 \times 0 = 0$
- $0.05 \times 300 = 15$
- $-0.05 \times -300 = 15$
$y = 5$
$x = -5$