

Effects of changing slope or y-intercept

Teacher Notes

Parts 1 and 2 of this lesson are to be done on the calculator. Part 3 uses the TI-Navigator System.

Part 1: Calculator Investigation of changing the y-intercept of an equation

In your calculators y= screen enter the equation $y = 2x + 5$ into y_1

Question: What is the y-intercept of this equation? 5

Question: If the y-intercept were decreased by 7, what would be the new y-intercept?
-2

Write a new equation using the new y-intercept and the same slope as the equation above.

$$y=2x-2$$

Enter this equation into y_2 on your calculator. Compare the graphs.

The graph moved down 7 units.

Question: If the original y-intercept were increased by 3, what would be the new y-intercept? 8

Write a new equation using the new y-intercept and same slope as the original equation.

$$y=2x+8$$

Enter this equation into y_2 on your calculator. Compare the graphs.

The graph moved up 3 units

Analysis: What effect does changing the y-intercept of an equation have on the graph?

*Increasing a y-intercepts moves the graph up.
Decreasing a y-intercept moves the graph down.*

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Part 2: Calculator investigation of changing the slope of an equation

In your calculator's $y=$ screen enter the equation $y = 2x + 5$ into y_1

Question: What is the slope of this equation? _____ **2** _____

Question: If the original slope were doubled, what would be the new slope? **4**

Write an equation using the new slope and same y-intercept as the original equation.

$$y=4x+5$$

Enter the new equation into y_2 . Compare the graphs.

The graph became steeper.

Question: If the original slope were tripled, what would be the new slope? **6**

Write an equation using the new slope and same y-intercept as the original equation.

$$y=6x+5$$

Enter the new equation into y_2 . Compare the graphs.

The graph became steeper. More steep than doubling the slope.

Question: If the original slope were halved, what would be the new slope? **1**

Write an equation using the new slope and same y-intercept as the original equation.

$$y=x+5$$

Enter the new equation into y_2 . Compare the graphs.

They became less steep (flatter).

Analysis: What effect does changing the slope have on the graph?

When multiplying by a number greater than 1 the graph becomes steeper. When multiplying by a number between 0 and 1 the graph will become less steep (flatter)

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Part 3: Assessment Section

Get into the Navigator application on your calculator. We will answer a few quick poll questions based on the knowledge you just discovered from the previous parts.

Load the Changing y-intercept activity setting. Before starting the quick polls assign the following colors to the matching equations.

Red: $2x + 5$

White: $2x + 2$

Green: $2x + 1$

Blue: $2x - 1$

Orange: $2x - 4$

Use this activity setting for questions 1-3. Send quick polls set for multiple choice A-D.

Question 1: Which line would you get if you increased the y-intercept of the green line by 4?

- a. Blue line
- b. Red line
- c. Orange line
- d. White line

Question 2: Which line would you get if you decreased the y-intercept of the white line by 3?

- a. Blue line
- b. Red line
- c. Orange line
- d. Green line

Question 3: Which line has a y-intercept that has been decreased from the blue line?

- a. Red line
- b. Orange line
- c. Green line
- d. White line

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Load the Changing slope activity setting. Before starting the quick polls assign the following colors to the matching equations.

Red: $x + 3$

White: $-.5x + 3$

Green: $2x + 3$

Blue: $-2x + 3$

Orange: $-x + 3$

Purple: $.5x + 3$

Use this activity setting for questions 4-6. Send quick polls set for multiple choice A-E.

Question 4: Which line would you get if you doubled the slope of the red line?

- a. Orange line
- b. Blue line
- c. Green line
- d. White line
- e. Purple line

Question 5: Which line would you get if you halved the slope of the blue line?

- a. Orange line
- b. Red line
- c. Green line
- d. White line
- e. Purple line

Question 6: Which line would you get if you multiplied the slope of the white line by 4?

- a. Orange line
- b. Red line
- c. Green line
- d. Blue line
- e. Purple line

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Load the Changing slope and y-intercept activity setting. Should be the equation $y=2x-1$. Use this activity setting for questions 7-9.

Question 7: What would be the equation you increased the y-intercept by 2 and multiplied the slope by -2?

- a. $y = 4x - 3$
- b. $y = 1 - 4x$
- c. $y = 2 + 4x$
- d. $y = -4x - 2$

Question 8: What would be the equation you decreased the y-intercept by 6 and multiplied the slope by .5?

- a. $y = .5x + 5$
- b. $y = -6 - x$
- c. $y = -7 + x$
- d. $y = x + 6$

Question 9: What effect does increasing the y-intercept by 2 and keeping the same x-intercept have on the slope of the line?

- a. The slope is doubled
- b. The slope is halved
- c. There is no change in the slope
- d. The slope changes from positive to negative