Math Man On The Slopes

ID: 11749

Time required
15-30 minutes

Activity Overview

In this activity, students will practice identifying slopes with informal pictures, and can self-check their understanding with one of the measurement tools. The students will also identify the slope and intercept of a given graph and will choose the correct equation in a multiple choice format.

Topic: Slope and Slope-intercept

- *Visual ideas about slope*
- *Finding the intercept*
- *Determining the slope*
- *Writing an equation from a line*

Teacher Preparation and Notes

- *Teacher preparation should include instruction about the basics of identifying positive and negative slopes, as well as intercepts. The students will need to have exposure and practice with the form y = mx + b, but can also gain confidence through self assessment items embedded in the file.*
- *Helpful hints would include the ability to move the cursor around the screen in order to hover over objects, or to select objects to grab and move. Practice with the grab and move feature would be beneficial.*
- ***To download the student TI-Nspire document (.tns file) and student worksheet, go to education.ti.com/exchange and enter "11749" in the keyword search box.***

Associated Materials

- *MathManSlopes_Student.doc*
- *MathManSlopes.tns*

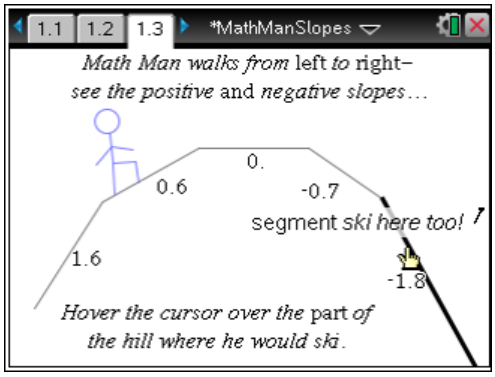
Suggested Related Activities

To download any activity listed, go to education.ti.com/exchange and enter the number in the keyword search box.

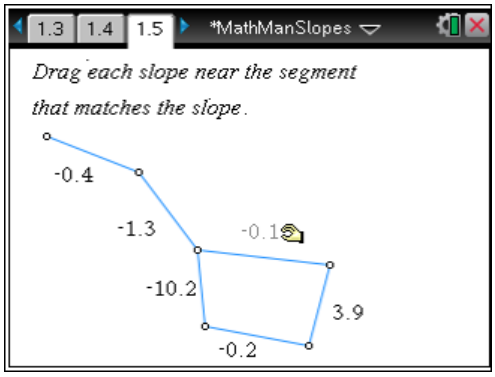
- *Slope Intercept Form (TI-84 Plus family with TI-Navigator) — 10624*
- *Exploring Slope Intercept Form of a Line (TI-84 Plus family with TI-Navigator) — 5094*
- *Using the Transform Application in an Algebra Class (TI-84 Plus family) — 6637*
- *Guess My Slope (TI-Nspire technology) — 9480*
- *Hitting the Slopes (TI-Nspire technology) — 9946*

Problem 1 – Visually Estimating Slope

Students are introduced to the visual idea of uphill and downhill slopes as one might see when looking at a ski slope. On page 1.3, after making a prediction on where Math Man should ski, students can hover their cursor over each segment to reveal which part of the "hill" would be best for a skier.



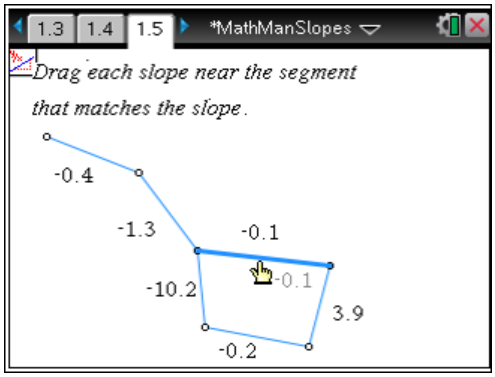
On page 1.5, students will see a representation of the "Big Dipper", a formation commonly recognized in the night sky. They are to grab and drag each numeric value near the segment that most closely matches that slope.



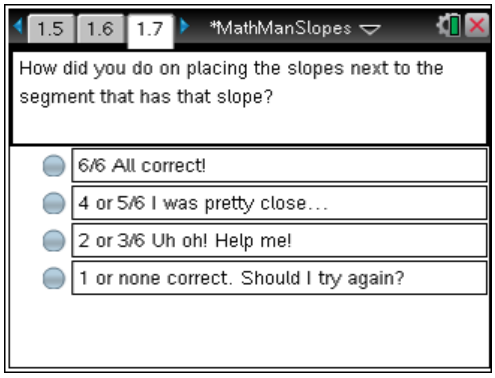
Helpful hint for students:

Choose the most obvious answers first, and leave the "tricky" ones for last.

Then students can use the **Slope** tool (**MENU > Measurement > Slope**) to verify their matches. Make sure that students understand that they do not need to click on each segment, as this will place the value on the page, but that they only need to hover the cursor over the segment until they see the correct value.

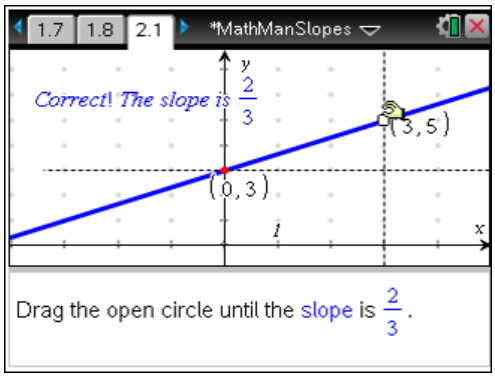


Pages 1.7 and 1.8 are self assessment questions for the students. This will help determine whether or not they understand how slope is represented and if they know what the letters of $y = mx + b$ represent. They can either answer in the calculator, or on their worksheet.



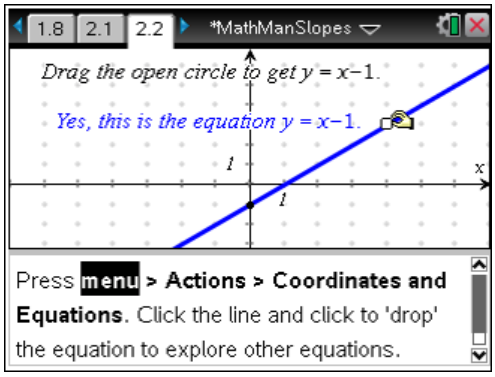
Problem 2 – Exploring Precise Slope

On page 2.1 is an interactive line where students can drag the open circle until the line has a slope of $\frac{2}{3}$. They can determine the slope by either looking at the slope triangle or by counting the grid spaces (rise over run).Students can check if the placement of the point is correct using the **Slope** tool.



Facilitate a discussion on the methods used to determine where to place the point to make a slope of $\frac{2}{3}$. Also discuss the coordinates of the point, the *y*-intercept, and the equation of the line. Students should understand that no matter what point they choose to make the slope $\frac{2}{3}$, the equation will remain the same.

On page 2.2 is the same interactive model, but this time students are not given the coordinates of the point or the triangle. They will need to work with the grid to determine where to move the point.

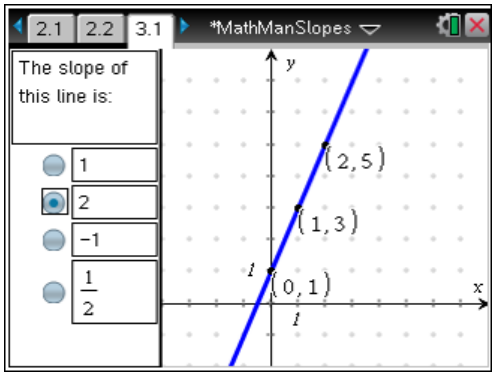


They can check their work using the **Slope** tool or the **Coordinates and Equations** tool (**MENU > Actions > Coordinates and Equations**).

Ask students if their method of determining where to place the point has changed. Challenge students to find another point that will give the same line.

Problem 3 – Slope-Intercept Equation

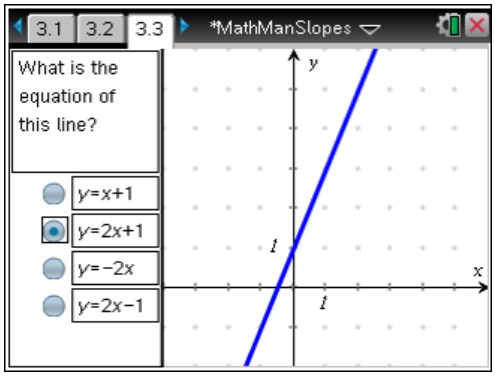
This problem is intended for students to tie slope, *y*-intercept, and equation, together.



The first question asks students to identify the slope of the line. Students can use the grid to count the slope triangle in the form of “rise over run” or they can mentally use the formula for slope since the points are labeled.

The second question asks students to identify the *y*-intercept of the line. They may need to be reminded that a *y*-intercept is on the vertical y-axis, and its ordered pair would be (0, *b*).

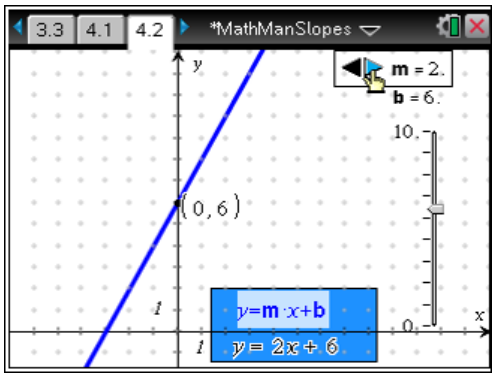
Students are to use both pieces of information to determine the slope-intercept form of the equation of the line.



Problem 4 – Assessing Understanding

Sliders are set up so that the student can investigate what he or she understands so far and what remains to be made clear about slope, *y*-intercepts, and the equation of a line. This page is useful as students complete the next multiple choice questions.

The questions are self-check. After students are all finished, have them press **MENU > Check Answer** to see how well they did.



Extensions/Homework

1. Draw a line on the worksheet or graph paper with *y*-intercept (0, 4) and any positive slope. Write its equation.

2. Draw a line on the worksheet or graph paper that goes through (8, 3) and has slope $m = 1$. Write its equation.

3. Draw a horizontal line that goes through (4, –1). Write its equation.