

6-6 Parallel and Perpendicular Lines

Day 1—Parallel Lines

Teacher: Michael Strange
Subject: Algebra I
Date: 1/19/2009

Week: 4.3
TEKs: A.6.(a) & A.6.(b)
Time Needed: 1 class

Written Curriculum

TEKs Knowledge and Skills

A.6 Linear functions. The student understands the meaning of the slope and intercepts of the graphs of linear functions and zeros of linear functions and interprets and describes the effects of changes in parameters of linear functions in real-world and mathematical situations.

TEKs Student Expectations

The student is expected to:

A.6. (a) develop the concept of slope as rate of change and determine slopes from graphs, tables, and algebraic representations;

A.6. (b) interpret the meaning of slope and intercepts in situations using data, symbolic representations, or graphs;

Vocabulary

Parallel, Perpendicular, Negative Reciprocal

Taught Curriculum

Content Objective(s)

TSWBAT identify parallel lines from graphs and equations and be able to write the equations for parallel lines.

Language Objective(s)

TSWBAT to explain what parallel lines are and how to write an equation for parallel lines.

Required Materials

Overhead projector or Chalkboard Pen and Paper Notebooks

Guiding Question(s)

1. *What are parallel lines?*
2. *How can you tell if two equations represent parallel lines?*
3. *How do you write the equation of a line parallel to a given line and through a given point?*

Intervention

1. *Writing the equation of a graphed line, including determining slope.*
2. *Using point-slope form to write the equation of a line through a point.*

IEP Modifications**Enrichment**

1. *Use the definition of parallel lines being equidistant to “prove” that lines are parallel.*

Presentation**Warm-up**

Have the students write what they think parallel lines are in their notebooks.

Direct Instruction

Begin by asking students for their definition of parallel lines. Some possibilities are:

1. *Lines that don't intersect*
2. *Lines that are equidistant*
3. *Lines that are transpositions of one another*

Draw two lines without a coordinate system and discuss the definition(s) given.

Add a coordinate system to the two horizontal lines.

Find the equations for the two lines.

Ask the students if they can see any similarity in the two equations. They should notice that the equations have the same slope. If the students are not responding then prompt them by referring back to previous lessons and the forms of the equations.

Rule: Nonvertical lines are parallel if they have the same slope and different y-intercepts. Any vertical lines are parallel.

KEY TO REMEMBER: The equal sign was first used by British mathematician Robert Recorde in 1557. Before then all sorts of symbols were used. He developed the symbol because “no two things are more equal than parallel lines”. So when the students need to remember what parallel lines have in common, they can just draw them and see that it’s an equal sign, signifying that slopes are equal.

Guided Practice

Draw several pairs of lines on a coordinate system, both parallel and not, and show how to determine if they are parallel.

Write several equations, again both parallel and not, and show how to determine if they are parallel. Include equations in different forms. (i.e. standard to slope-intercept).

Independent/Group Practice

Give several exercises similar to the guided practice for students to work on alone. Come back together and solve.

Directed Instruction

Now we will cover writing the equation for a line parallel to a given line through any point and through a given point. Stress the importance of using the given property to solve these problems.

Given a line equation: write any equation with the same slope and a different y-intercept in slope-intercept form

$$y = mx + b$$

Given a line equation and a point: write an equation in point-slope form.

$$(y - y_1) = m(x - x_1)$$

Guided Practice

Write several equations and then determine the equations of parallel lines both through an arbitrary point and through a given point. Include equations that must be manipulated to determine the slope.

Independent/Group Practice

Similar exercises to the guided practice. Small group work to turn in.

Closure

Have the students write in their notebook:

- 1. What parallel lines are and how to determine if two lines are parallel.*
- 2. How to write the equation for a parallel line through a point and through an arbitrary point.*

Tested Curriculum

Assessment

#1 Summative: Walk around while students are working independently/in groups and determine the degree to which they are understanding the lesson.

#2 Formative:

- 1. Group work turned in for a grade.*
- 2. HW: pg. 346 #1, 3, 6, 7, 9, 13-18*

Reflection

The students picked up the idea that parallel lines have the same slope rather quickly. I think that most of them saw that in the graph. When they were asked about whether two equations represented

parallel lines, they had a bit more difficulty. I think this is because they are not yet comfortable pulling the slope out of an equation. They need more exposure to playing with the slope.