

Perpendicular Lines in the Coordinate Plane: **Focusing on Negative Reciprocal Slopes**

Lesson Plan

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Goal: This lesson is designed to show students the relationship between perpendicular lines in the coordinate plane. The primary goal being that the student can find a line through a given point perpendicular to a given line.

Grade and Course: 10th Grade Geometry

KY Standards: MA-HS-3.3.1

Objectives: The student will be able to:

- Find the slope of a line perpendicular to a given line by finding the negative reciprocal slope
- Identify whether two given lines are perpendicular based on their slopes
- Find the equation of a line perpendicular to another line and through a given point

Resources/materials needed: Ruler, protractor, additional book problems or worksheets

Description of Plan: This lesson is designed to be a discovery lesson where the students try to identify the relationship between the slopes of perpendicular lines on their own. The class will begin by the students working on the attached worksheet, *PERPENDICULAR LINES IN THE COORDINATE PLANE*. This will lead them to discover the relationship between the slopes. The worksheet will then be discussed and the ideas reinforced by working example problems as a class. Additional problems from a worksheet or their book should be assigned for homework or the remainder of the class.

Lesson Source: Original

Instructional Mode: Start with an activity to allow for student discovery of the concepts and finish with a lecture.

Date Given: 11-16-2006

Estimated Time: 50 minutes

Date Submitted to Algebra³: 1-8-2007

PERPENDICULAR LINES IN THE COORDINATE PLANE

1)

a) Plot the points $(2,1)$ and $(-2,-1)$ and using a ruler connect them with a line.

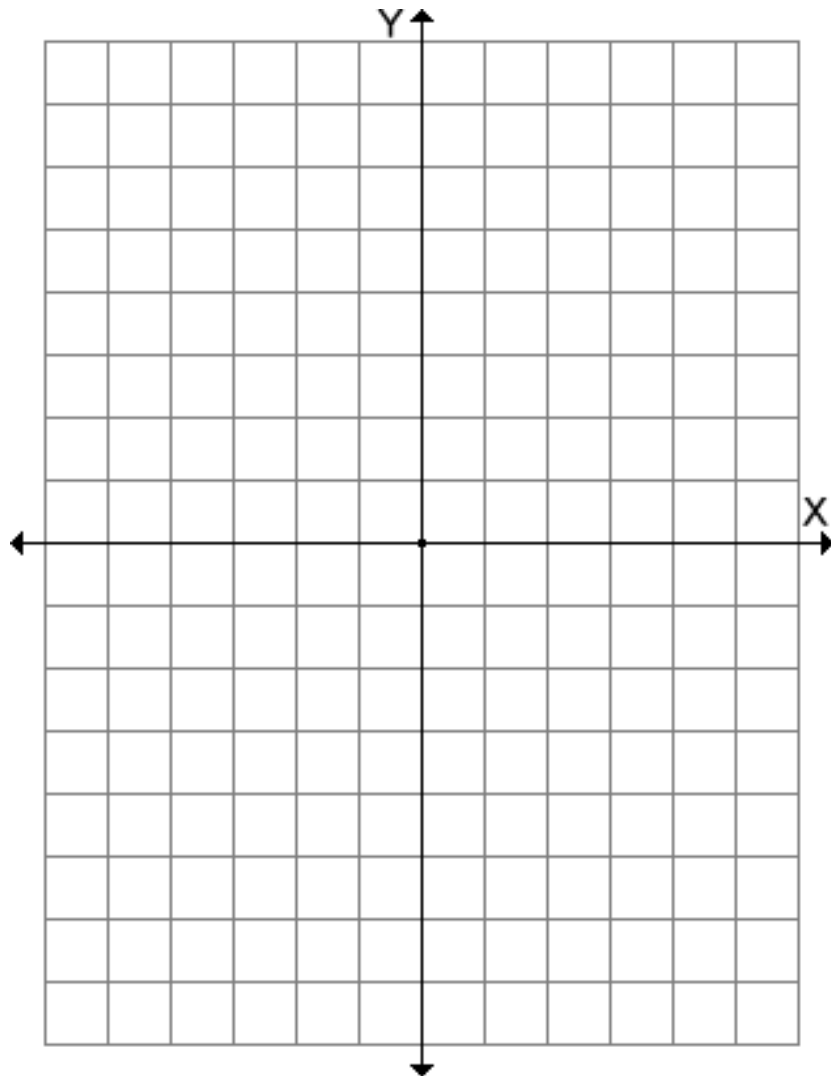
b) What is the slope of this line?

c) Plot the points $(-1,2)$ and $(1,-2)$ and using a ruler connect them with a line.

d) What is the slope of this line?

e) Use a protractor to measure the angles formed by the lines. Are the two lines perpendicular?

f) What do you get when you multiply the slopes of the two lines together? What is the relationship between these numbers?



2)

a) Plot the points $(2,2)$ and $(-4,-2)$ and using a ruler connect them with a line.

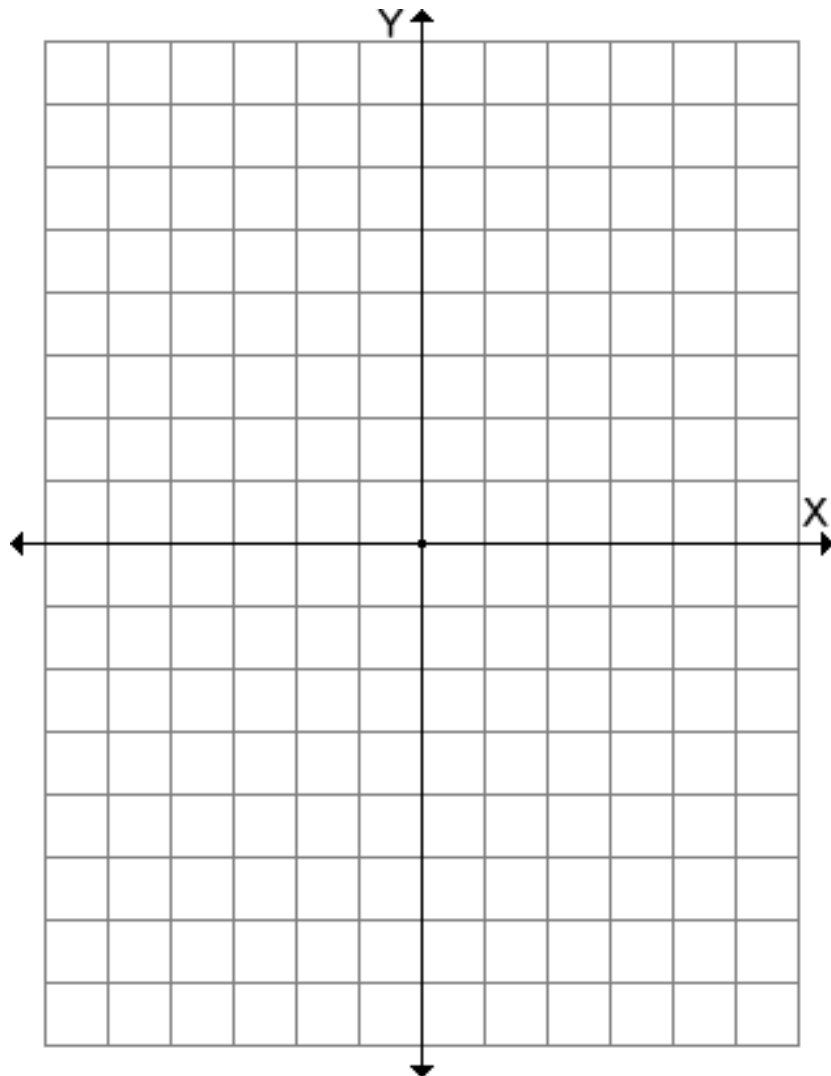
b) What is the slope of this line?

c) Plot the points $(-3,3)$ and $(1,-3)$ and using a ruler connect them with a line.

d) What is the slope of this line?

e) Use a protractor to measure the angles formed by the lines. Are the two lines perpendicular?

f) What do you get when you multiply the slopes of the two lines together? What is the relationship between these numbers?



3) Looking at #1 and #2, what can you conclude about the relationship between the slopes of two perpendicular lines?