Linear Models and Rates of Change

Objectives

- Find the slope of a line given two points
- Write the equation of a line with a given point and slope
- Interpret slope as a ratio or a rate in a real life application
- Sketch the graph of a linear equation in slope-intercept form
- Write equations of lines that are parallel or perpendicular to a given line

Review
Summary of equations of lines
Give an example of each form.

General Form	$3x + 4y - 2 = 0$
Standard Form	$3x + 4y = 2$
Vertical line	$x = 4$
Horizontal line	$y = -2$
Point-slope form	$y - y_1 = m(x - x_1)$
Slope intercept form	$y = mx + b$

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_x - x_1}; \; x_2 \neq x_1$$

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

Parallel and Perpendicular lines

What determines two lines being parallel or perpendicular?

Are any of these lines parallel or perpendicular?

$$3x - 5y = 8$$

$$\frac{2}{3}x - 6 = y$$

$$2x - 3y = 18$$

$$5x + 3y - 4 = 0$$

Write an equation of a line in general form of the line passing through $\left(\frac{7}{8}, \frac{3}{4}\right)$ & $\left(\frac{5}{4}, -\frac{1}{4}\right)$

$$32x + 12y - 37 = 0$$

A company reimburses its sales representative $150 per day for lodging and meals plus $0.34 per mile driven. How much does it cost the company if a sales representative drives 134 miles on a given day?

$$y = .34x + 150$$

$$\$195.56$$

The table shows the rate r (in miles per hour) that a vehicle is traveling after t seconds

t	5	10	15	20	25	30
r	57	74	85	84	61	43

a) Plot the data by hand and connect adjacent points with a line segment

b) Use the slope of each line segment to determine the interval when the vehicle's rate changed most rapidly. How did the rate change?

Homework

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