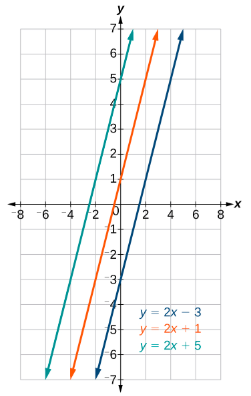
Math 1111 – More on Slope

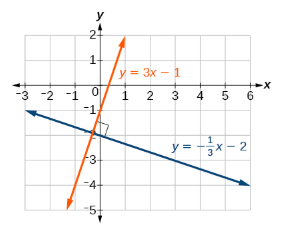
Objectives:

1. Find slopes and equations of parallel and perpendicular lines

2. Interpret slope as a rate of change and find a function’s average rate of change

Parallel lines will never intersect. They have the same slope and different y-intercepts. Perpendicular lines intersect by forming a 90° angle. The slope is the negative reciprocals of each other.





Perpendicular Lines

Parallel Lines

**Objective 1:** Find slopes and equations of parallel and perpendicular lines.

To write the equation of a line parallel or perpendicular to another line, we follow the same principles as we do for finding the equation of any line. After finding the slope, use the point-slope formula to write the equation of the new line.

To find the equation of a line parallel or perpendicular line to a given line, given a point:

1. Find the slope of the given line by getting it into the slope-intercept form.

2. Use the same slope for a parallel line or the negative reciprocal for a perpendicular line.

3. Use the slope and the given point with the point-slope formula.

4. Simplify the line to the slope-intercept form and compare the equation to the given line.

Example #1: Find the equation of the line, parallel and perpendicular to the following equations and points.

A. 5x = 7 + y and passing through the point (-1, -2)

B. 5x – 3y + 4 = 0 and passing through the point (-4, 1)

**Objective 2:** Interpret slope as a rate of change and find a function’s average rate of change.

The slope of a line can be interpreted as a rate of change. The rate of change describes how an output quantity changes relative to the change in the input quantity. The units on a rate of change “output units per input units”

The average rate of change between two input values is the total change of the function values (output values) divided by the change in the input values.

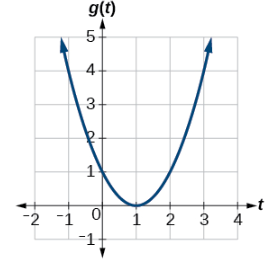
Example #2: Answer each of the questions.

A. Using the data below, find the average rate of change of the price of gasoline between 2007 and 2009.

B. Using the data below, find the average rate of change of the price of gasoline between 2005 and 2010.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gasoline Prices | | | | | | | | |
| *y* | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| *C(y)* | 2.31 | 2.62 | 2.84 | 3.30 | 2.41 | 2.84 | 3.58 | 3.68 |

C. Using the graph below, find the average rate of change on the interval [-1, 2].



D. Compute the average rate of change of *f(x)* = x2 - on the interval [2, 4].

E. Compute the average rate of change of *f(x)* = x - 2 on the interval [1, 9].

OpenStax College Algebra, College Algebra. OpenStax CNX. Aug 2, 2019 http://cnx.org/contents/9b08c294-057f-4201-9f48-5d6ad992740d@11.1.

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