

## Objective 1 - Construct a linear function from points

*Use points to construct a linear function.*

Link to section in OpenStax textbook and link to section in Prelude to Active Calculus textbook.

First, watch the video below to learn about what is necessary to construct a linear function. You can use the notes here to follow along with the video and record your thoughts.

YouTube link: <https://www.youtube.com/watch?v=1lpWLGn81y0>

**Question 1** Find the equation of the line containing the two points below. Write the equation in slope-intercept form.  
 $(-7, -6)$  and  $(8, -7)$

$$y = \boxed{-0.06666666666666667}x + \boxed{-6.466666666666667}$$

**Hint:** To construct a linear function, we need its slope and a single point on the line. Can we figure out the slope from two points?

**Question 2** Find the equation of the line containing the two points below. Write the equation in slope-intercept form.  
 $(6, -7)$  and  $(3, 2)$

$$y = \boxed{-3.0}x + \boxed{11.0}$$

**Question 3** Find the equation of the line containing the two points below. Write the equation in slope-intercept form.  
 $(-3, 8)$  and  $(7, -4)$

$$y = \boxed{-1.2}x + \boxed{4.4}$$

For these problems, you'll be given a description of the line and a point. Think about what information you should get from the line, then use the point to construct a new linear function.

Learning outcomes: Recognize and construct linear functions as well as solve linear equations.

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**Question 4** Find the equation of the line described below. Write the equation of the line in slope-intercept form.

Parallel to  $9x + 9y = 7$  and passing through the point  $(3, 7)$ .

$$y = \boxed{-1.0}x + \boxed{10.0}$$

**Hint:** If a line is parallel to another, what does that mean about its slope?

**Question 5** Find the equation of the line described below. Write the equation of the line in slope-intercept form.

Parallel to  $9x + 9y = 7$  and passing through the point  $(-5, -6)$ .

$$y = \boxed{-1.0}x + \boxed{-11.0}$$

**Question 6** Find the equation of the line described below. Write the equation of the line in slope-intercept form.

Perpendicular to  $5x - 6y = 9$  and passing through the point  $(9, 6)$ .

$$y = \boxed{-1.2}x + \boxed{16.799999999999997}$$

**Hint:** If a line is perpendicular to another, what does that mean about its slope?

**Question 7** Find the equation of the line described below. Write the equation of the line in slope-intercept form.

Perpendicular to  $9x - 7y = 5$  and passing through the point  $(-10, 7)$ .

$$y = \boxed{-0.7777777777777778}x + \boxed{-0.7777777777777777}$$