Chapter 2.3 Linear Models

July 18, 2018

Example 1. The number of full time faculty at 4 year colleges and universities (in thousands) in selected years is shown below

year	2001	2003	2005	2007	2009
faculty	764	814	917	991	1038

a) Let x = 1 correspond to 2001, plot the points (x,y) where x is the year and y is the number of faculty

(1,764) (3,814) (5,917) (7,991) (9,1038) Plotting these points you notice they don't exactly match up and form a line. If you were to draw a line though two of the points it would be different depending on which two points you would pick.

b) Use data points (5,917) and (7,991) to find an equation of the line

Just as before find the slope first and then use either point to write the point-slope formula and then solve for y to get the slope-intercept formula.

$$m = \frac{991 - 917}{7 - 5} = \frac{74}{2} = 37$$

$$y - 917 = 37(x - 5) \rightarrow y - 917 = 37x - 185 \rightarrow y = 37x + 732$$

c) Use data points (3,814) and (5,917) to find an equation of the line

Do just as before.

$$m = \frac{917 - 814}{5 - 3} = \frac{103}{2} = 51.5$$

$$y - 814 = 51.5(x - 3) \rightarrow y - 814 = 51.5x - 154.5 \rightarrow y = 51.5x + 659.5$$