

Each problem is worth 5 points. Clear and complete justification is required for full credit.

1. The manager of a furniture factory finds that it costs \$2200 to manufacture 100 chairs in one day and \$4800 to produce 300 chairs in one day. Express the cost as a function of the number of chairs produced, assuming that it is linear.

$$\begin{array}{l} 2200, 100 \\ 4800, 300 \end{array}$$

$$\frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{4800 - 2200}{300 - 100} = \frac{2600}{200} \quad m = 13$$

$$y - 2200 = 13(x - 100)$$

$$y - 2200 = 13x - 1300$$

$$y - 2200 + 1300 = 13x$$

$$y - 900 = 13x$$

$$y = 13x + 900$$

Wonderful!

2. The monthly cost of driving a car depends on the number of miles driven. Lynn finds that in May it cost her \$380 to drive 480 miles and in June it cost her \$460 to drive 800 miles. Assuming that the relationship is linear, predict the cost of a month in which she drives 600 miles.¹

$$(480, 380)$$

$$(800, 460)$$

First I'll find the slope:

$$m = \frac{460 - 380}{800 - 480} = \frac{80}{320} = \frac{1}{4}$$

Now I'll plug $m = \frac{1}{4}$, $x_1 = 480$, and $y_1 = 380$ into point-slope:

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

$$y - 380 = \frac{1}{4}(x - 480)$$

or

$$y = \frac{1}{4}x + 260$$

$$\text{so } f(600) = \frac{1}{4} \cdot 600 + 260$$

$$= 150 + 260$$

$$= \$410$$

is what she'll pay in a month she drives 600 miles.

¹Both problems borrowed from Stewart 5th, p. 36.