

$$1.10.3 \quad \frac{0-2}{-10-2} = \frac{-2}{-12} = \frac{1}{6}.$$

1.10.11 The line goes through  $(0, 4)$  and  $(4, 0)$ , therefore the slope is  $\frac{4-0}{0-4} = -1$ . Hence, the equation of the line is of the form

$$y = -x + b.$$

The line goes through  $(0, 4)$ , hence

$$4 = b.$$

It follows that the equation of the line is

$$y = -x + 4.$$

1.10.28 We transform the given line equation to the slope-intercept form:

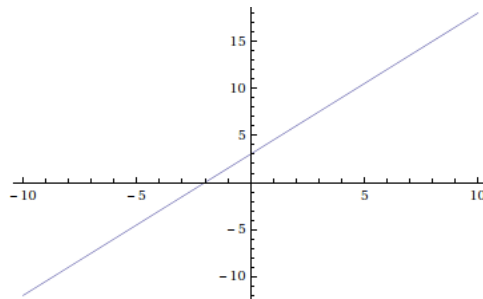
$$\begin{aligned} 2x + 3y + 4 &= 0 \\ 3y &= -2x - 4 \\ y &= -\frac{2}{3}x - \frac{4}{3} \end{aligned}$$

The equation of the desired line is:  $y = -\frac{2}{3}x + 6$ .

1.10.45 We transform the given line equation to the slope-intercept form:

$$\begin{aligned} \frac{1}{2}x - \frac{1}{3}y + 1 &= 0 \\ \frac{1}{2}x + 1 &= \frac{1}{3}y \\ \frac{1}{3}y &= \frac{1}{2}x + 1 \\ y &= \frac{3}{2}x + 3 \end{aligned}$$

The slope of the line is  $\frac{3}{2}$ . The  $y$ -intercept of the line is  $(0, 3)$ . The graph of the line is:



**1.10.57** *Step 1.* We find the midpoint of  $A$  and  $B$ . Let  $M$  be the midpoint. Its coordinates are given by:

$$M = \left( \frac{1+7}{2}, \frac{4-2}{2} \right) = (4, 1).$$

*Step 2.* We find the slope of the line determined by  $A$  and  $B$ . Its slope is given by:

$$S_{AB} = \frac{-2-4}{7-1} = \frac{-6}{6} = -1.$$

*Step 3.* We find the slope of the desired line. If we let  $S_C$  be the slope, the perpendicularity of the lines implies  $S_{AB} \cdot S_C = -1$ . Therefore:

$$S_C = \frac{-1}{s_{AB}} = \frac{-1}{-1} = 1.$$

*Step 4.* We find the equation of the desired line. The slope of the line is 1, so its equation is of the form

$$y = x + b.$$

Since the line goes through  $M(4, 1)$ , we have

$$1 = 4 + b \iff b = -3.$$

It follows that the equation of the line is

$$y = x - 3.$$

**1.10.72** (a) The “line” goes through  $(100, 2200)$  and  $(300, 4800)$ , therefore, the slope of the line is

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

which, in turn, implies that the equation of the line is of the form

$$y = 13x + b.$$

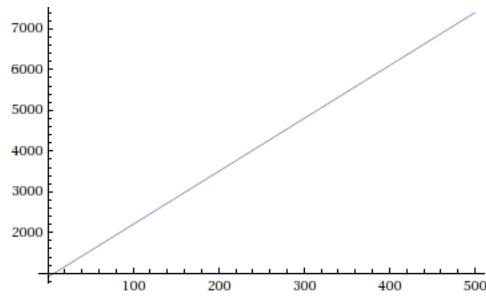
We plug  $(100, 2200)$  into the above equation:

$$2200 = 13(100) + b \iff 2200 = 1300 + b \iff b = 900.$$

It follows that the equation of the line is

$$y = 13x + 900.$$

The graph of the equation is:



- (b) The slope of the line is 13. This means that it costs 13 dollars to produce each chair.  
(c) The  $y$ -intercept of the line is 900. This means that it costs 900 dollars to begin the production.