

# Homework 2

## Section 1.3

$$2. \quad m = \frac{\text{change in } y}{\text{change in } x} = \frac{8-0}{6-2} = \frac{8}{4} = 2$$

$$5. \quad m = \frac{2 - (-4)}{5 - 3} = \frac{6}{2} = 3$$

$$8. \quad m = \frac{(-10) - (-2)}{\frac{11}{3} - \frac{11}{3}} = \frac{-8}{0} \quad \text{undefined slope!}$$

$$15. \quad m = \frac{(-\frac{5}{6}) - \frac{5}{2}}{\frac{1}{4} - \frac{2}{3}} = \frac{-\frac{20}{6}}{-\frac{5}{12}} = \frac{20}{6} \times \frac{12}{5} = 8$$

$$16. \quad m = \frac{(-\frac{1}{4}) - \frac{3}{4}}{\frac{5}{4} - \frac{7}{8}} = \frac{-1}{\frac{3}{8}} = -\frac{8}{3}$$

$$21. \quad y - 7 = -3(x - 1)$$

$$\Rightarrow y = -3x + 10$$

additional points:  $(0, 10), (2, 4), (3, 1)$

$$22. \quad y - (-6) = (-1) \cdot (x - 10)$$

$$\Rightarrow y = -x + 4$$

additional points:  $(0, 4), (1, 3), (2, 2)$

$$27. \quad \text{Let } x=0: \quad -5y = 15 \Rightarrow y = -3$$

so  $y$ -intercept:  $(0, -3)$

$$\text{slope: } 5y = 7x - 15 \Rightarrow y = \frac{7}{5}x - 3 \quad \text{so } m = \frac{7}{5}$$

28. Let  $x=0$ :  $0 - 5y = 15 \Rightarrow y = -3$   
y-intercept:  $(0, -3)$

$$5y = 6x - 15 \Rightarrow y = \frac{6}{5}x - 3$$

so slope is  $\frac{6}{5}$

31.  $x=4$  has no y-intercept since the line is vertical  
slope is undefined

37. slope  $m = \frac{3-0}{(-1)-0} = -3$

$$\Rightarrow (y-0) = -3(x-0) \Rightarrow y = -3x$$

40. slope  $m = \frac{(+1) - (+1)}{10 - 6} = 0$

line is horizontal.

$$\Rightarrow y = +1$$

44.  $m = \frac{(-\frac{1}{4}) - \frac{3}{4}}{\frac{5}{4} - \frac{7}{8}} = \frac{-1}{\frac{3}{8}} = -\frac{8}{3}$

$$\Rightarrow (y + \frac{1}{4}) = -\frac{8}{3}(x - \frac{5}{4})$$

$$\Rightarrow y = -\frac{8}{3}x + \frac{10}{3} - \frac{1}{4}$$

$$\Rightarrow y = -\frac{8}{3}x + \frac{37}{12}$$

$$45. \quad m = \frac{8-4}{\frac{1}{2} - (-\frac{1}{2})} = \frac{4}{1} = 4$$

$$\Rightarrow y - 4 = 4(x + \frac{1}{2})$$

$$\Rightarrow y = 4x + 6$$

50. The line is vertical =

$$x = 0$$

51.  $m = 1 \Rightarrow$  horizontal line

$$y = -2$$

61. horizontal line  $\Rightarrow m = 0$   
y-intercept at  $-10 \Rightarrow b = -10$   
 $y = mx + b$

$$\Rightarrow y = 0 \cdot x - 10 = -10$$

$$63. \quad x + y = 7 \Rightarrow y = -x + 7$$

$$\Rightarrow m = -1 \quad (\text{slope})$$

$$a) \quad y - 2 = (-1)(x - (-3))$$

$$\Rightarrow y = -x - 1$$

$$b) \quad m_1 = -\frac{1}{m} = +1$$

$$\Rightarrow y - 2 = (+1)(x - (-3))$$

$$\Rightarrow y = x + 5$$

67.  $y = -3$  horizontal line,  $m = 0$   
slope

a)  $y - 0 = 0 \cdot (x - (-1))$

$\Rightarrow y = 0$

b) perpendicular line has slope

$$m_1 = -\frac{1}{m} = -\frac{1}{0} \text{ (undefined)}$$

$\Rightarrow$  vertical line

$\Rightarrow x = -1$

69.  $x = 2$  vertical line  
slope  $m$  undefined

a) vertical line passing  $(1, 1)$

$\Rightarrow x = 1$

b) perpendicular line has slope

$$m = 0 \text{ (horizontal line)}$$

$\Rightarrow y = 1$

80. a) points on the line ( $y = mt + b$ )  
 $(2, 26300), (4, 29700)$

$$\Rightarrow m = \frac{29700 - 26300}{4 - 2} = \frac{3400}{2}$$

$$= 1700$$

$$\Rightarrow Y - 26300 = 1700(t - 2)$$

$$\Rightarrow Y = 1700t + 22900$$

b) year 2008 equals  $t = 8$

$$\begin{aligned}\Rightarrow Y_{2008} &= 1700 \times 8 + 22900 \\ &= 36500\end{aligned}$$

81. Let  $F = mC + b$ ; two points on the line are

$$(0, 32), (100, 212)$$

$$\Rightarrow \text{slope } m = \frac{212 - 32}{100 - 0} = \frac{9}{5}$$

$$\Rightarrow F - 32 = \frac{9}{5}(C - 0)$$

$$\Rightarrow F = \frac{9}{5}C + 32$$

82. a)  $102.5 = \frac{9}{5}C + 32$

$$\Rightarrow \frac{9}{5}C = 70.5$$

$$\Rightarrow C = 70.5 \times \frac{5}{9} \approx 39.17$$

b)  $74 = \frac{9}{5}C + 32$

$$\Rightarrow \frac{9}{5}C = 74 - 32 = 42$$

$$\Rightarrow C = 42 \times \frac{5}{9} = \frac{210}{3} = 70$$

83.

$$C = 150 + 0.34 \cdot x$$

88. Enrollment ( $E$ ) vs year ( $t$ ):

$$E = mt + b$$

$$\text{slope } m = \frac{2702 - 2546}{2004 - 2002} = \frac{156}{2} = 78$$

$$\Rightarrow y - 2546 = 78(t - 2002)$$

$$\Rightarrow y = 78t - 153610$$

Let  $t = 2008$ ,

$$y = 78 \times 2008 - 153610$$

$$= 3014 \text{ students}$$