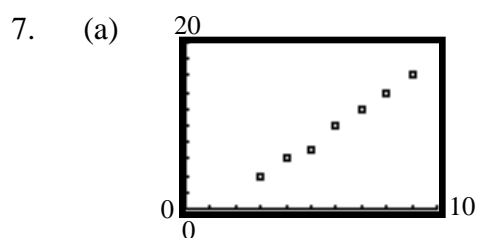


## Graphs

### 2.5 Scatter Diagrams; Linear Curve Fitting

1. Linear,  $m > 0$
2. Nonlinear
3. Linear,  $m < 0$
4. Nonlinear
5. Nonlinear
6. Linear,  $m > 0$



- (b) Answers will vary. We select (4,6) and (8,14). The slope of the line containing these points is:

$$m = \frac{14 - 6}{8 - 4} = \frac{8}{4} = 2$$

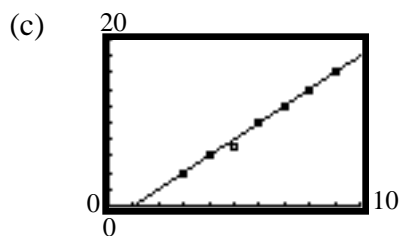
The equation of the line is:

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

$$y - 6 = 2(x - 4)$$

$$y - 6 = 2x - 8$$

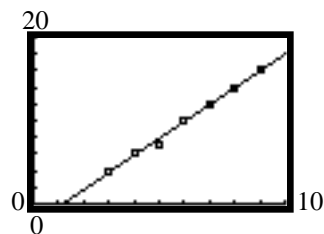
$$y = 2x - 2$$



- (d) Using the LINear REGression program, the line of best fit is:

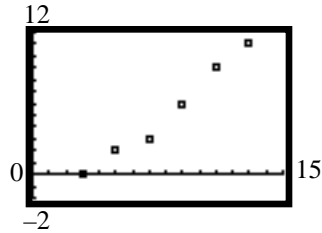
$$y = 2.0357x - 2.3571$$

- (e)



## Section 2.5 Scatter Diagrams; Linear Curve Fitting

8. (a)



(b) Selection of points will vary. We select (5,2) and (11,9). The slope of the line containing these points is:

$$m = \frac{9-2}{11-5} = \frac{7}{6}$$

The equation of the line is:

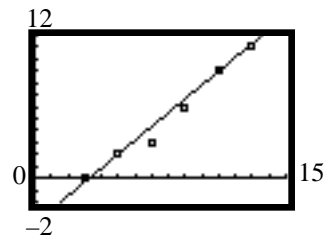
$$y - y_1 = m(x - x_1)$$

$$y - 2 = \frac{7}{6}(x - 5)$$

$$y - 2 = \frac{7}{6}x - \frac{35}{6}$$

$$y = \frac{7}{6}x - \frac{23}{6}$$

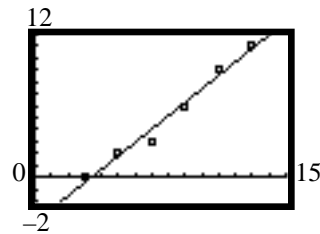
(c)



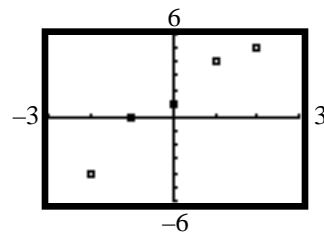
(d) Using the LINear REGression program, the line of best fit is:

$$y = 1.1286x - 3.8619$$

(e)



9. (a)



(b) Answers will vary. We select (-2,-4) and (1,4). The slope of the line containing these points is:

$$m = \frac{4 - (-4)}{1 - (-2)} = \frac{8}{3}$$

The equation of the line is:

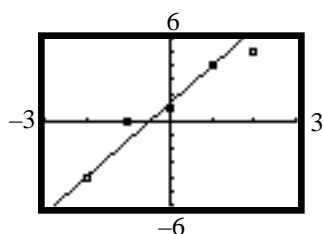
$$y - y_1 = m(x - x_1)$$

$$y - (-4) = \frac{8}{3}(x - (-2))$$

$$y + 4 = \frac{8}{3}x + \frac{16}{3}$$

$$y = \frac{8}{3}x + \frac{4}{3}$$

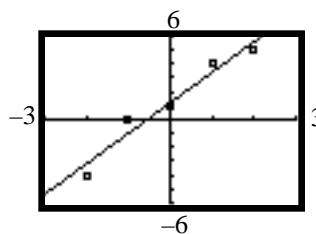
(c)



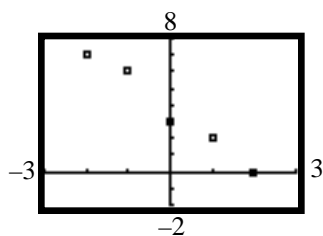
(d) Using the LINear REGression program, the line of best fit is:

$$y = 2.2x + 1.2$$

(e)



10. (a)



(b) Selection of points will vary. We select  $(-1, 6)$  and  $(1, 2)$ . The slope of the line containing these points is:

$$m = \frac{2 - 6}{1 - (-1)} = \frac{-4}{2} = -2$$

The equation of the line is:

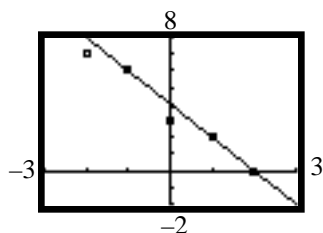
$$y - y_1 = m(x - x_1)$$

$$y - 6 = -2(x - (-1))$$

$$y - 6 = -2x - 2$$

$$y = -2x + 4$$

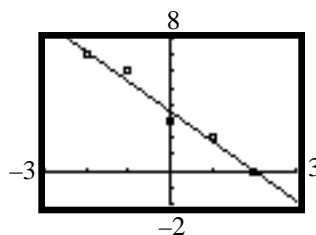
(c)



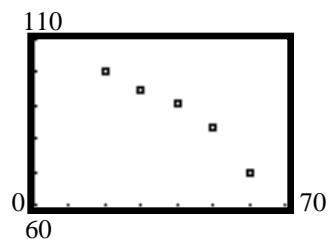
(d) Using the LINear REGression program, the line of best fit is:

$$y = -1.8x + 3.6$$

(e)



11. (a)



(b) Answers will vary. We select  $(30, 95)$  and  $(60, 70)$ . The slope of the line containing these points is:

$$m = \frac{70 - 95}{60 - 30} = \frac{-25}{30} = \frac{-5}{6}$$

The equation of the line is:

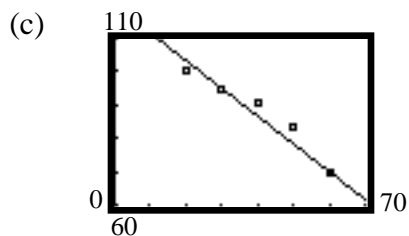
$$y - y_1 = m(x - x_1)$$

$$y - 95 = \frac{-5}{6}(x - 30)$$

$$y - 95 = \frac{-5}{6}x + 25$$

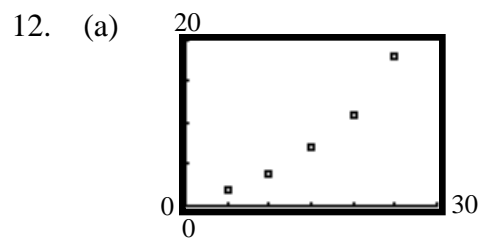
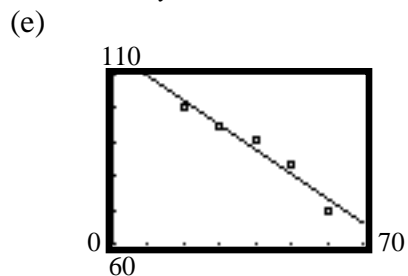
$$y = \frac{-5}{6}x + 120$$

## Section 2.5 Scatter Diagrams; Linear Curve Fitting



- (d) Using the LINEar REGression program, the line of best fit is:  

$$y = -0.72x + 116.6$$



- (b) Selection of points will vary. We select (10,4) and (20,11). The slope of the line containing these points is:

$$m = \frac{11 - 4}{20 - 10} = \frac{7}{10}$$

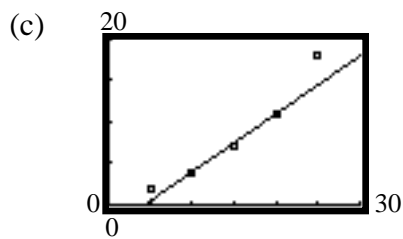
The equation of the line is:

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

$$y - 4 = \frac{7}{10}(x - 10)$$

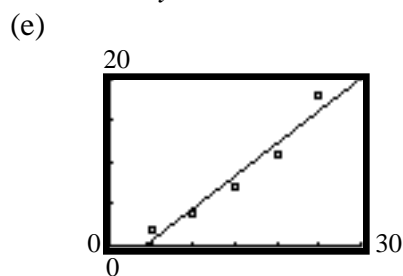
$$y - 4 = \frac{7}{10}x - 7$$

$$y = \frac{7}{10}x - 3$$

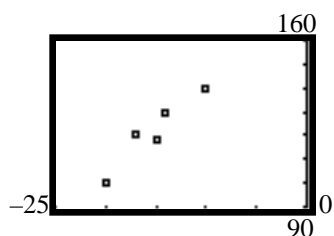


- (d) Using the LINEar REGression program, the line of best fit is:  

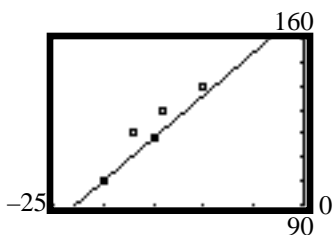
$$y = 0.78x - 3.3$$



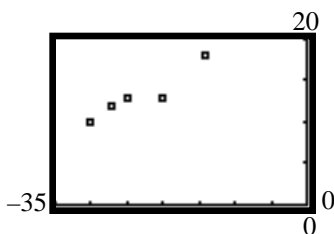
13. (a)



(c)



14. (a)



(b) Answers will vary. We select  $(-20, 100)$  and  $(-15, 118)$ . The slope of the line containing these points is:

$$m = \frac{118 - 100}{-15 - (-20)} = \frac{18}{5}$$

The equation of the line is:

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

$$y - 100 = \frac{18}{5}(x - (-20))$$

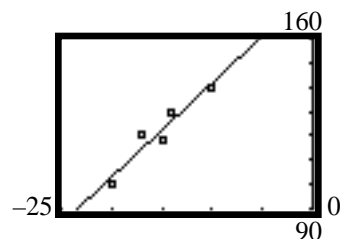
$$y - 100 = \frac{18}{5}x + 72$$

$$y = \frac{18}{5}x + 172$$

(d) Using the LINEar REGression program, the line of best fit is:

$$y = 3.8613x + 180.2920$$

(e)



(b) Selection of points will vary. We select  $(-27, 12)$  and  $(-20, 13)$ . The slope of the line containing these points is:

$$m = \frac{13 - 12}{-20 - (-27)} = \frac{1}{7}$$

The equation of the line is:

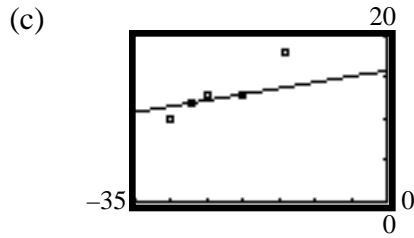
$$y - y_1 = m(x - x_1)$$

$$y - 12 = \frac{1}{7}(x - (-27))$$

$$y - 12 = \frac{1}{7}x + \frac{27}{7}$$

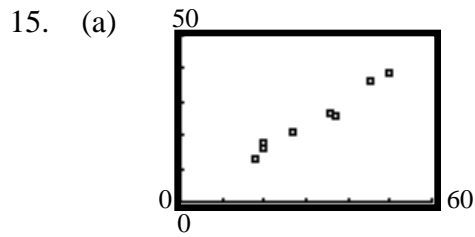
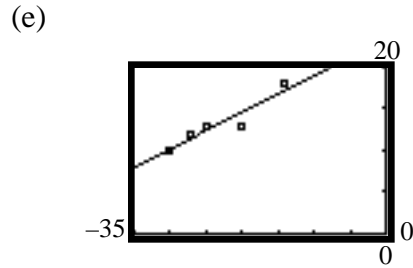
$$y = \frac{1}{7}x + \frac{111}{7}$$

## Section 2.5 Scatter Diagrams; Linear Curve Fitting



- (d) Using the LINEar REGression program, the line of best fit is:  

$$y = 0.4421x + 23.4559$$



- (b) using points  $(20, 16)$  and  $(50, 39)$ ,  

$$\text{slope} = \frac{39 - 16}{50 - 20} = \frac{23}{30}$$

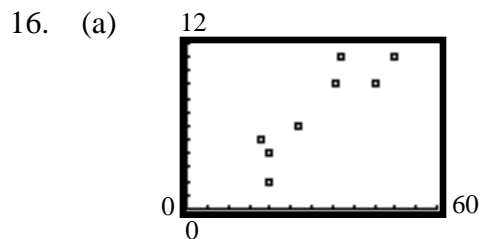
the point slope formula yields

$$C - 16 = \frac{23}{30}(I - 20)$$

$$C = \frac{23}{30}I - \frac{460}{30} + 16$$

$$C = 0.76I + 0.67$$

- (c) As disposable income increases by \$1, consumption increases by \$0.76.  
 (d)  $C = 0.77(42) + 0.67 = \$33.01$   
 A family with disposable income of \$42,000 consumes about \$33,010.  
 (e)  $C = 0.7549I + 0.6266$



- (b) using points  $(20, 4)$  and  $(50, 11)$ ,  

$$\text{slope} = \frac{11 - 4}{50 - 20} = \frac{7}{30} \approx 0.23$$

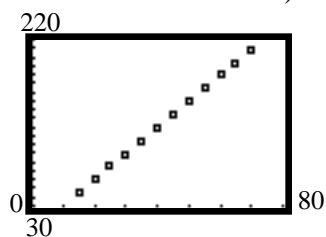
the point slope formula yields

$$S - 4 = 0.23(I - 20)$$

$$S = 0.23I - 0.6$$

- (c) As disposable income increases by \$1, savings increases by \$0.23.  
 (d)  $S = 0.23(42) - 0.6 = 9.06$   
 A family with disposable income of \$42,000 saves about \$9,060.  
 (e)  $S = 0.2451I - 0.6266$

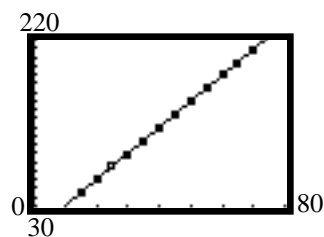
17. (a) (Data used in graphs is in thousands.)



- (d) As annual income increases by \$1, the loan amount increases by \$2.9814.

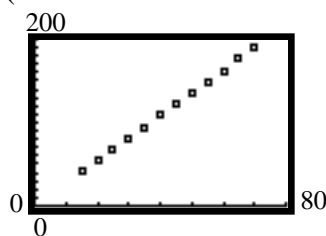
(b)  $L = 2.9814I - 0.0761$

(c)



- (e)  $L = 2.9814(42) - 0.0761 = 125.143$   
A person with an annual income of \$42,000 would qualify for a loan of about \$125,143.

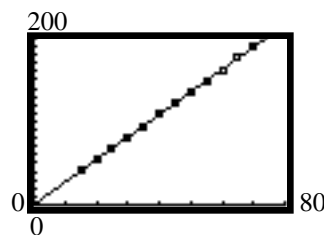
18. (a) (All amounts are in thousands.)



- (d) As annual income increases by \$1, the loan amount increases by \$2.7098.

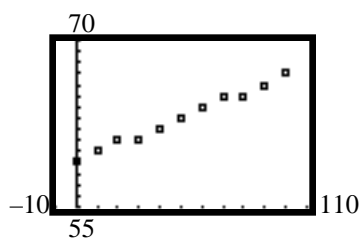
(b)  $L = 2.7098I - 0.0661$

(c)



- (e)  $L = 2.7098(42) - 0.0661 = 113.746$   
A person with an annual income of \$42,000 would qualify for a loan of about \$113,746.

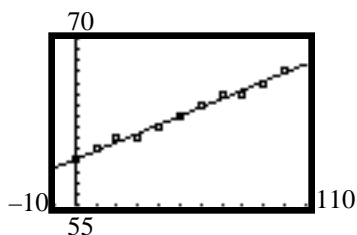
19. (a)



- (d) As relative humidity increases by 1%, the apparent temperature increases by 0.0782°.

(b)  $T = 0.0782h + 59.0909$

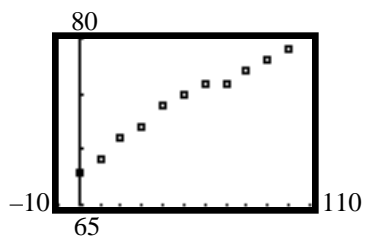
(c)



- (e)  $T = 0.0782(75) + 59.0909 = 64.96$   
A relative humidity of 75% would give an apparent temperature of 65°.

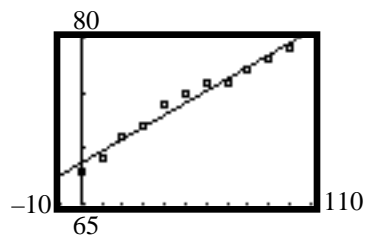
## Section 2.5 Scatter Diagrams; Linear Curve Fitting

20. (a)



(b)  $T = 0.1082h + 68.6818$

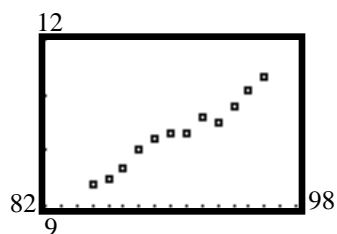
(c)



(d) As relative humidity increases by 1%, the apparent temperature increases by  $0.1082^\circ$ .

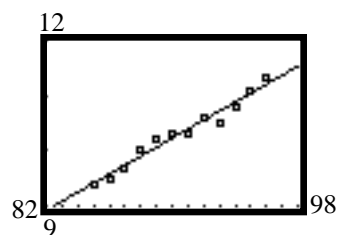
(e)  $T = 0.1082(75) + 68.6818 = 76.80$   
A relative humidity of 75% would give an apparent temperature of  $77^\circ$ .

21. (a)



(b)  $M = 0.1633x - 4.4691$

(c)



(d) As the year increases by 1, the average miles per car (in thousands) increases by 0.1633.

(e)  $M = 0.1633(97) - 4.4691 = 11.371$   
In 1997, the average number of miles driven per car is 11,371.