

SOLUTIONS - CHAPTER 2 EXERCISES

2.1 The equation of the least-squares line is $y = \frac{223}{124}x + \frac{165}{62} \approx 1.7984x + 2.6613$.

Linear System Method We need the following quantities:

$$\begin{aligned}\sum x &= 18 \\ \sum y &= 51 \\ \sum x^2 &= 64 \\ \sum xy &= 163\end{aligned}$$

The linear system to be solved is

$$\begin{aligned}64m + 18b &= 163 \\ 18m + 7b &= 51\end{aligned}$$

The solution to this linear system will determine the value of the slope, m , and the y -intercept, b .

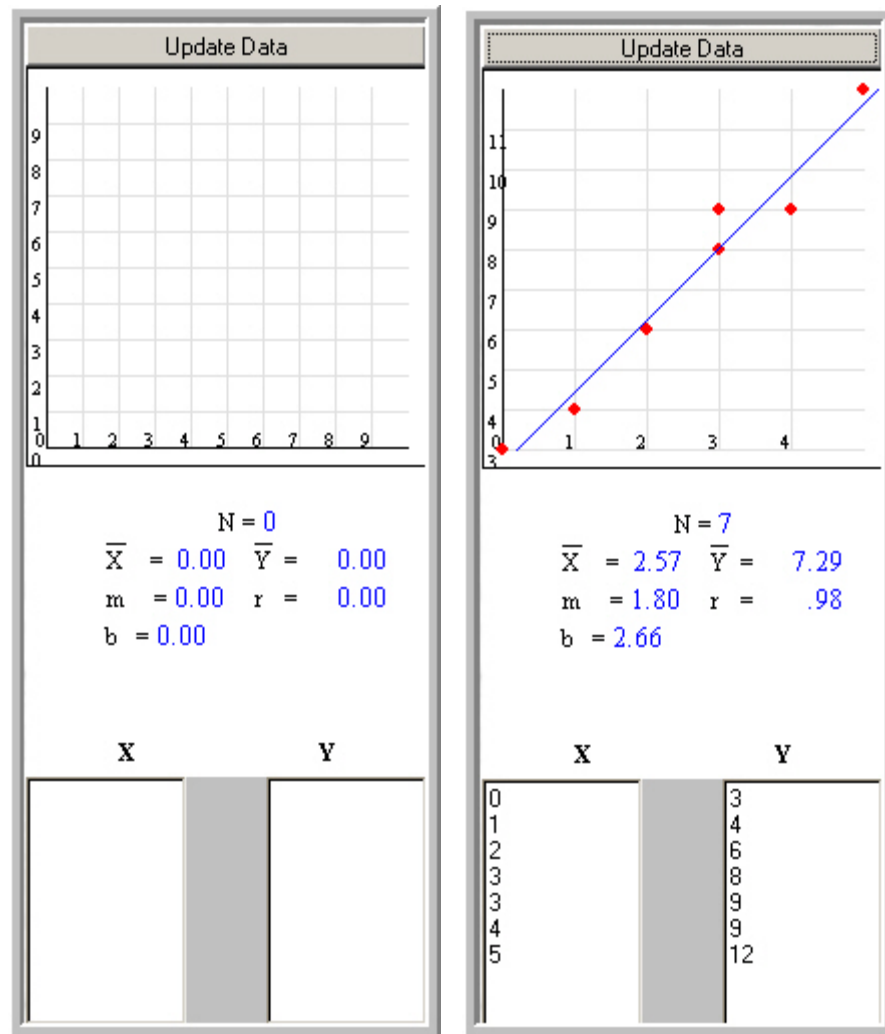
Calculator Method (TI-83) Enter the x -values into the list L1 and the y -values into the list L2. Go to the [STAT] button and choose the CALC menu. From the CALC menu choose 4:LinReg(ax+b) and then [ENTER]. Add the names of the two lists (separated by a comma) and hit [ENTER] again.

L1	L2	L3	3
0	0		
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LinReg(ax+b) L1,
L2
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```
LinReg
y=ax+b
a=1.798387097
b=2.661290323
r^2=.964039237
r=.9818549979
```

Applet Method Enter the data into the columns. Click the “Update Data” button to see the scatter plot of the data, the least-squares line, and the regression equation.



2.3 The equation of the least-squares line is $y = \frac{326}{35}x + \frac{191}{15} \approx 9.3143x + 12.7333$.

Linear System Method We need the following quantities:

$$\sum x = 21$$

$$\sum y = 272$$

$$\sum x^2 = 91$$

$$\sum xy = 1115$$

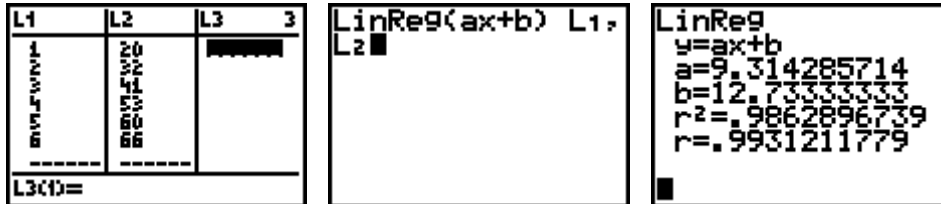
The linear system to be solved is

$$91m + 21b = 1115$$

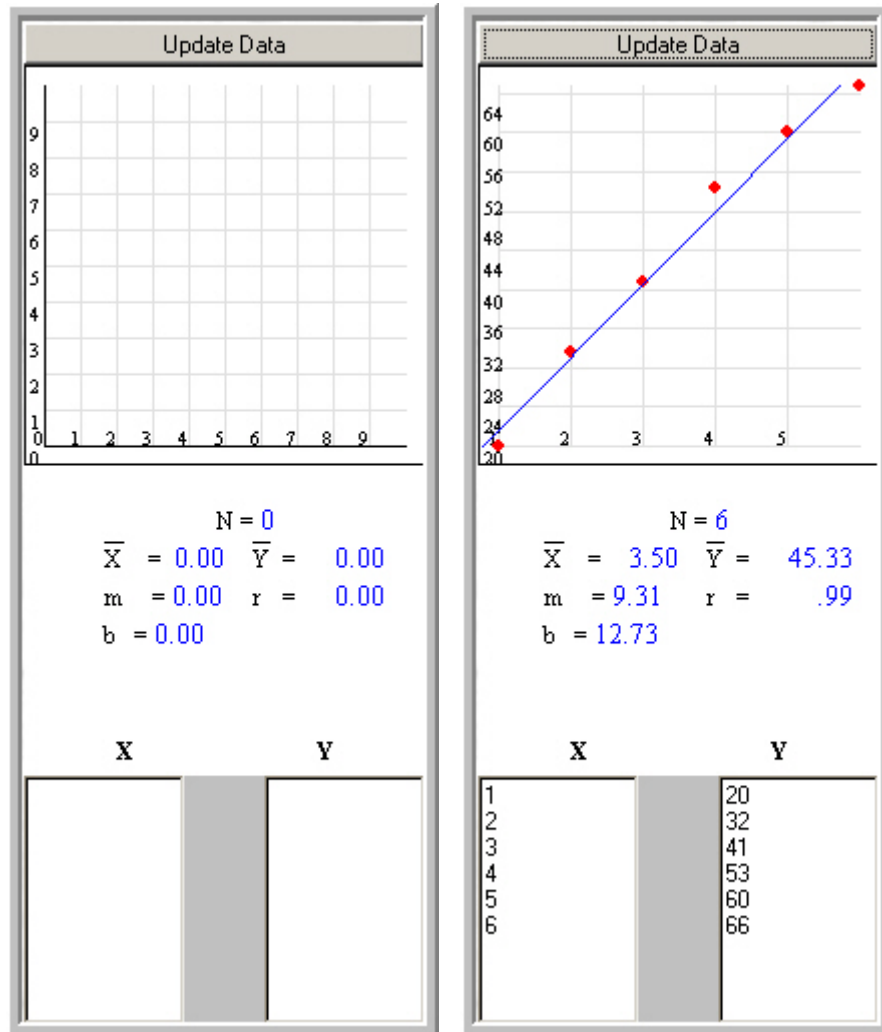
$$21m + 6b = 272$$

The solution to this linear system will determine the value of the slope, m , and the y -intercept, b .

Calculator Method (TI-83) Enter the x -values into the list L1 and the y -values into the list L2. Go to the [STAT] button and choose the CALC menu. From the CALC menu choose 4:LinReg(ax+b) and then [ENTER]. Add the names of the two lists (separated by a comma) and hit [ENTER] again.



Applet Method Enter the data into the columns. Click the “Update Data” button to see the scatter plot of the data, the least-squares line, and the regression equation.



2.5 Sales are unlikely to increase steadily year to year so a linear model would not be appropriate to estimate next year's sales.

2.7 An annual income of \$45,800 is equivalent to $x = 45.8$. Insert this value into the least-squares equation to find

$$\begin{aligned}y &= -0.4723(45.8) + 48.4871 \\ &\approx 26.85576\end{aligned}$$

Therefore, the estimated number of hours of television watched per week is approximately 26.86 hours.

2.9 Yes, since $|-0.9625|$ is close to 1, this suggests that a linear function models the situation well. The negative sign indicates that as x increases, y decreases. In other words, as income increases, the average amount of television watching decreases.