

## Hardrock 100

*Note: This exercise goes with Chapter 1 of either Finite Mathematics or Calculus with Applications.*

If you think a marathon is a long race, consider the Hardrock 100, a 101.1 mile running race held in southwestern Colorado. The following chart lists the times that the 1994 winner, Scott Hirst, arrived at various mileage points along the way.\*

miles	time (hours:minutes)
0	0
12.2	2:57
19.0	5:03
28.0	7:22
33.4	9:26
36.6	10:10
43.8	11:16
59.4	16:01
69.6	21:40
78.4	24:00
85.0	26:48
91.5	28:59
101.1	32:00

- What was Hirst's average speed?
- Graph the data, plotting time on the  $x$ -axis and distance on the  $y$ -axis. You will need to convert the time from hours and minutes into hours. Do the data appear to lie approximately in a straight line?
- Find the equation for the least squares line, fitting distance as a linear function of time.
- Calculate the coefficient of correlation. Does it indicate a good fit of the least squares line to the data? Verify your answer by plotting both the data and the least squares line on the same graphing calculator screen.
- Based on your answer to part d, what is a good value for Hirst's average speed? Compare this with your answer to part a. Which answer do you think is better? Explain your reasoning.

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\* Marny Frantz and Sylvia Lazarnick, "Data Analysis and the Hardrock 100," *The Mathematics Teacher*, Vol. 90, No. 4, April 1970, pp. 274-276.

**Answers** can be found on the next page.

Answers to **Hardrock 100**

- a. 3.16 miles per hour
- b. yes
- c.  $y = 3.06x + 4.54$
- d. .9964; yes
- e. 3.06 miles per hour