Extending Concepts

Heat Index In Exercises 21–26, use the heat index chart and the information below.

The heat index is the temperature the body feels when heat and humidity are combined. The chart shows the heat index that corresponds to the actual air temperature and relative humidity. This chart is based upon shady, light wind conditions. Exposure to direct sunlight can increase the heat index by up to 15°F. The National Weather Service will issue an excessive heat warning when the heat index is expected to exceed 105°F in the next 36 hours. From 2000 to 2009, heat killed more people in the United States than any other weather-related incident.

Heat Index With Prolonged Exposure Temperature (°F) and/or Physical Activity 100 102 104 106 108 110 **Extreme Danger** Heat stroke or sunstroke 100 104 109 114 119 124 130 Relative humidity (%) highly likely 99 103 108 113 118 124 131 137 Danger 97 101 106 112 117 124 130 137 Sunstroke, muscle cramps, 91 95 100 105 110 116 123 129 137 and/or heat exhaustion likely 93 98 103 108 114 121 126 130 95 100 105 112 119 126 134 **Extreme Caution** 92 97 103 109 116 124 132 Sunstroke, muscle cramps, 94 100 106 113 121 129 and/or heat exhaustion possible 96 102 110 117 126 135 **Caution** 98 105 113 122 131 93 100 108 117 127 Fatigue possible 95 103 112 121 132

- **21.** On average, lightning kills 48 people per year. Heat kills 237.5% more people each year than lightning. What is the annual fatality rate of heat?
- **22.** On average, tornadoes kill 100 fewer people per year than heat. What is the annual fatality rate of tornadoes?
- 23. Suppose tomorrow's high temperature is predicted to be 92°F with a relative humidity of 80%. Should the National Weather Service issue an excessive heat warning? Explain your reasoning.
- **24.** Suppose you are climbing the west side of a mountain on a sunny afternoon. The temperature is 88°F with a relative humidity of 60%. Should you be concerned about the heat index? Explain your reasoning.
- **25.** Holding the relative humidity constant, does the heat index have a linear relationship with the temperature? Explain your reasoning.
- **26.** How might the heat index affect the planning of a hiking trip?

