

14. A floor-refinishing company charges \$1.83 per square foot to strip and refinish a tile floor for up to 1000 square feet. There is an additional charge of \$350 for toxic waste disposal for any job which includes more than 150 square feet of tile.
- Express the cost, y , of refinishing a floor as a function of the number of square feet, x , to be refinished.
 - Graph the function. Give the domain and range.
15. A museum charges \$40 for a group of 10 or fewer people. A group of more than 10 people must, in addition to the \$40, pay \$2 per person for the number of people above 10. For example, a group of 12 pays \$44 and a group of 15 pays \$50. The maximum group size is 50.
- Draw a graph that represents this situation.
 - What are the domain and range of the cost function?
16. At a supermarket checkout, a scanner records the prices of the foods you buy. In order to protect consumers, the state of Michigan passed a "scanning law" that says something similar to the following:

If there is a discrepancy between the price marked on the item and the price recorded by the scanner, the consumer is entitled to receive 10 times the difference between those prices; this amount given must be at least \$1 and at most \$5. Also, the consumer will be given the difference between the prices, in addition to the amount calculated above.

For example: If the difference is 5¢, you should receive \$1 (since 10 times the difference is only 50¢ and you are to receive at least \$1), plus the difference of 5¢. Thus, the total you should receive is $\$1.00 + \$0.05 = \$1.05$.
 If the difference is 25¢, you should receive 10 times the difference in addition to the difference, giving $(10)(0.25) + 0.25 = \$2.75$.
 If the difference is 95¢, you should receive \$5 (because $10(.95) = \$9.50$ is more than \$5, the maximum penalty), plus 95¢, giving $5 + 0.95 = \$5.95$.

- What is the lowest possible refund?
 - Suppose x is the difference between the price scanned and the price marked on the item, and y is the amount refunded to the customer. Write a formula for y in terms of x . (Hints: Look at the sample calculations.)
 - What would the difference between the price scanned and the price marked have to be in order to obtain a \$9.00 refund?
 - Graph y as a function of x .
17. Many printing presses are designed with large plates that print a fixed number of pages as a unit. Each unit is called a signature. A particular press prints signatures of 16

pages each. Suppose $C(p)$ is the cost of printing a book of p pages, assuming each signature printed costs \$0.14.

- What is the cost of printing a book of 128 pages? 129 pages? p pages?
 - What are the domain and range of C ?
 - Graph $C(p)$ for $0 \leq p \leq 128$.
18. Gore Mountain is a ski resort in the Adirondack mountains in upstate New York. Table 2.12 shows the cost of a weekday ski-lift ticket for various ages and dates.
- Graph cost as a function of age for each time period given. (One graph will serve for times when rates are identical).
 - For which age group does the date affect cost?
 - Graph cost as a function of date for the age group mentioned in part (b).
 - Why does the cost fluctuate as a function of date?

Table 2.12 Ski-lift ticket prices at Gore Mountain, 1998–1999⁶

Age	Opening- Dec 12	Dec 13- Dec 24	Dec 25- Jan 3	Jan 4- Jan 15	Jan 16- Jan 18
Up to 6	Free	Free	Free	Free	Free
7–12	\$19	\$19	\$19	\$19	\$19
13–69	\$29	\$34	\$39	\$34	\$39
70+	Free	Free	Free	Free	Free
Age	Jan 19- Feb 12	Feb 13- Feb 21	Feb 22- Mar 28	Mar 29- Closing	
Up to 6	Free	Free	Free	Free	
7–12	\$19	\$19	\$19	\$19	
13–69	\$34	\$39	\$34	\$29	
70+	Free	Free	Free	Free	

19. Sometimes a relationship is defined by two independent variables. The wind chill index is one such function. The wind chill, denoted W , is a measure of how cold it feels; it takes into account both the temperature, T , and the wind velocity, V . The function can be called $W(T, V)$ to show that W depends on both T and V . One model for wind chill is the piecewise function shown below.

$$W(T, V) =$$

$$\begin{cases} T & \text{for } 0 \leq V \leq 4 \\ 0.0817(5.81 + 3.71\sqrt{V} - 0.25V)(T - 91.4) + 91.4 & \text{for } 4 < V \leq 45 \\ 1.60T - 55 & \text{for } V > 45. \end{cases}$$

- Two of the three rules of the piecewise function are linear. Which are they?
- For which velocities does the wind have no further effect on the perceived temperature?
- How hard must the wind blow so that a temperature of 40°F feels like 9°F?

⁶The Olympic Regional Development Authority.