Applications

In auto sales, appearance is everything, or almost everything. It is certainly the most important single factor in a consumer's decision to buy this or that make.

—Harley Earl, designer/inventor of the Corvette

TEACH

Exercise 6

Have the students also do the problem if $x < m$ just to point out the difference. Exercises 8, 9, and 10 have discrete domains.

ANSWERS

1. Although consumers consider gas mileage, condition, options, status, and other things when purchasing a new or used car, the look of the car is a major determinant of what car people will buy.

1. Interpret the quote in the context of what you learned about buying and selling cars in this lesson. See margin.
2. The *North Shore News* charges \$19.50 for a two-line automotive ad. Each additional line costs \$7. How much does a six-line ad cost? \$47.50
3. The *Antique Auto News* charges \$10 for a 10-word classified ad. Each additional word costs \$0.40. For an extra \$40, a seller can include a photo in the ad. How much would a 20-word ad with a photo cost? \$54
4. A local newspaper charges g dollars for a four-line classified ad. Each additional line costs d dollars. Write an expression for the cost of a seven-line ad. $g + 3d$
5. The *Auto Times* charges g dollars for a classified ad with m or less lines. Each additional line is d dollars. If $x > m$, express the cost of an x-line ad algebraically. $g + d(x - m)$
6. Samantha purchased a used car for \$4,200. Her state charges 4% tax for the car, \$47 for registration, \$50 for a new title certificate, and \$35 for a state safety and emissions inspection. How much does Samantha need to pay for these extra charges, not including the price of the car? \$300
7. Ralph placed a classified ad to sell his used SUV for \$18,500. After 2 weeks, he didn't sell the SUV, and the newspaper suggested lowering the price 5%. What would the new price be if Ralph reduced it according to the suggestion? \$17,575
8. The *Bayside Bugle* charges by the word to run automotive ads. The newspaper charges \$18 for the first 20 words and \$0.35 for each additional word. How much would a 27-word ad cost? \$20.45
9. A local publication charges by the character for its classified ads. Letters, numbers, spaces, and punctuation each count as one character. They charge \$46 for the first 200 characters and \$0.15 for each additional character.
   a. If x represents the number of characters in the ad, express the cost $c(x)$ of an ad as a piecewise function. See Additional Answers.
   b. Graph the function from part a. See Additional Answers.
   c. Find the coordinates of the cusp in the graph in part b. (200, 46)
10. The *Kings Park Register* gives senior citizens a 10% discount on automotive ads. Mr. Quadrino, a senior citizen, is selling his car and wants to take out a four-line ad. The paper charges \$6.50 per line. What is the price of the ad for Mr. Quadrino? \$23.40
11. The *Good Ole Times* magazine charges for ads by the "column inch." A column inch is as wide as one column, and it is 1 inch high. The cost is \$67 per column inch. How much would the magazine charge to print a 2½-inch ad? \$167.50

12. Leslie placed this ad in *Collector Car Monthly*.

> 1957 Chevrolet Nomad station wagon. Tropical Turquoise, 6 cyl. auto, PS, PW, AM/FM, repainted, rebuilt transmission, restored two-tone interior. Mint! Moving, sacrifice, $52,900. 555-4231

a. If the publication charges $48 for the first three lines and $5 for each extra line, how much will this ad cost Leslie? $53
b. Ruth buys the car for 8% less than the advertised price. How much does she pay? $48,668
c. Ruth must pay her state 6% sales tax on the sale. How much must she pay in sales tax? $2,920.08

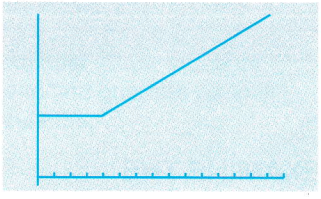
13. *Online Car Auctioneer* charges a commission for classified ads. If the car sells, the seller is charged 4% of the *advertised* price, not of the price for which the car actually sells. If the car doesn't sell, the seller pays nothing. If Barbara advertises her Cadillac for $12,000 and sells it for $11,200, how much must she pay for the ad? $480

14. The cost of an ad in a local paper is given by the piecewise function.

$$c(x) = \begin{cases} 38 & \text{when } x \le 4 \\ 38 + 6.25(x - 4) & \text{when } x > 4 \end{cases}$$

a. Find the cost of a three-line ad. $38
b. Find the difference in cost between a one-line ad and a four-line ad. $0
c. Find the cost of a seven-line ad. $56.75
d. Graph this function on your graphing calculator. See margin.
e. Find the coordinates of the cusp from the graph in part d. (4, 38)

14.d.



15. Express the following classified ad rate as a piecewise function. Use a *let* statement to identify what x and y represent. See margin.

$29 for the first five lines and $6.75 for each additional line.

15. Let x = number of lines in the ad
Let $c(x)$ = cost of the ad

$$c(x) = \begin{cases} 29 & \text{when } x \le 5 \\ 29 + 6.75(x - 5) & \text{when } x > 5 \end{cases}$$

16. The piecewise function describes a newspaper's classified ad rates.

$$y = \begin{cases} 21.50 & \text{when } x \le 3 \\ 21.50 + 5(x - 3) & \text{when } x > 3 \end{cases}$$

16a. The cost is $21.50 for three lines or less, and $5 for each additional line.

a. If x represents the number of lines, and y represents the cost, translate the function into words. See margin.
b. If the function is graphed, what are the coordinates of the cusp? (3, 21.50)

17. A local *coupon mailer* charges $11 for each of the first three lines of an ad and $5 for each additional line.
a. What is the price of a two-line ad? $22
b. What is the price of a five-line ad? $43
c. If x is the number of lines in the ad, express the cost $c(x)$ of the ad as a piecewise function. See margin.

17c. $c(x) = \begin{cases} 11x & \text{when } x \le 3 \\ 33 + 5(x - 3) & \text{when } x > 3 \end{cases}$

18. Ace Auto Repair needs a new mechanic, so they place a help-wanted ad. The *Position Posted* job website charges $15 to post, plus $2.50 for each of the first five lines and $8 for each additional line. If x is the number of lines in the ad, write a piecewise function for the cost of the ad, $c(x)$. See margin.

18. $c(x) = \begin{cases} 15 + 2.5x & \text{when } x \le 5 \\ 27.50 + 8(x - 5) & \text{when } x > 5 \end{cases}$