

## 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 5

Have the students also do the problem if  $x < m$  just to point out the difference.

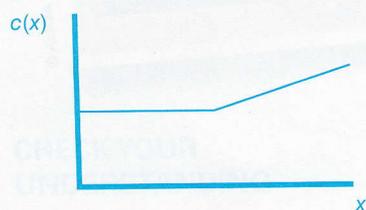
### ANSWERS

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.

9a.

$$c(x) = \begin{cases} 46 & \text{when } x \leq 200 \\ 46 + 0.15(x - 200) & \text{when } x > 200 \end{cases}$$

9b.



- Interpret the quote in the context of what you learned. *See margin.*
- The *North Shore News* charges \$19.50 for a two-line classified ad. Each additional line costs \$7. How much does a six-line ad cost? **\$47.50**
- The *Antique Auto News* charges \$45 for a three-line classified ad. Each additional line costs \$8.50. For an extra \$40, a seller can include a photo in the ad. How much would a four-line ad with a photo cost? **\$93.50**
- 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.  $g + 3d$
- 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.  $g + d(x - m)$
- Samantha purchased a used car for \$4,200. Her state charges 4% tax for the car, \$47 for license plates, 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? **\$250**
- Ralph placed a classified ad to sell his used Honda Odyssey minivan for \$18,500. After two weeks, he didn't sell the minivan, and the newspaper suggested lowering the price 5%. What would the new price be if Ralph reduced it according to the suggestion? **\$17,575**
- The *Bayside Bugle* charges by the word to run classified ads. The newspaper charges \$18 for the first 20 words and \$0.35 for each additional word. How much would a 27-word classified ad cost? **\$20.45**
- A local newspaper 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.
  - If  $x$  represents the number of characters in the ad, express the cost  $c(x)$  of an ad as a piecewise function. *See margin.*
  - Graph the function from part a. *See margin.*
  - Find the coordinates of the cusp in the graph in part b. **(200, 46)**
- The *Kings Park Register* gives senior citizens a 10% discount on classified 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**
- The *Good Ole Times* magazine charges for classified ads by the "column inch." A column inch is as wide as one column, and it is one inch high. The cost is \$67 per column inch. How much would the magazine charge to print a  $2\frac{1}{2}$ -inch ad? **\$167.50**

12. Leslie placed this ad in the *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

**Exercise 15**

The more practice students get with this type of problem, the better. Make up similar problems for additional practice.

**Exercise 16**

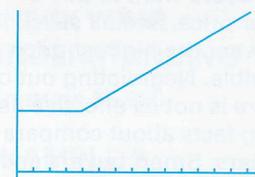
See if students, based on patterns in the problems they have seen already, can find the coordinates of the cusp by just inspecting the piecewise function.

**Exercise 17**

Have students bring in a local *Pennysaver* and contact them to find the cost of their classified ads.

**ANSWERS**

14d.



15. Let  $x$  = number of lines in the ad

Let  $c(x)$  = cost of the ad

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

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

17c.

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

- a. If the newspaper charges \$48 for the first three lines and \$5 for each extra line, how much will this ad cost Leslie? **\$58**
  - 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. The *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

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

- 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)**
15. Express the following classified ad rate as a piecewise function. Use a let statement to identify what  $x$  and  $y$  represent.
- \$29 for the first five lines, and \$6.75 for each additional line. **See margin.**
16. The piecewise function describes a newspaper's classified ad rates.
- $$y = \begin{cases} 21.50 & \text{when } x \leq 3 \\ 21.50 + 5(x - 3) & \text{when } x > 3 \end{cases}$$
- 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 *Pennysaver* charges \$11 for each of the first three lines of a classified 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.**
18. The *Position Posted* online job website charges \$15 to place a classified ad plus \$2.50 for each of the first five lines, and \$8 for each additional line after the fifth line. If  $x$  is the number of lines in the ad, write a piecewise function for the cost of the ad,  $c(x)$ .

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