PROBLEM SOLVING

EXAMPLE 5 on p. 797 for Exs. 40–43

40. CREDIT CARD FEES The average late payment fee F (in dollars) on a credit card account during the period 1994–2003 can be modeled by

$$F = \frac{12 + 1.6x^2}{1 + 0.04x^2}$$

where x is the number of years since 1994. Rewrite the model so that it has only whole number coefficients. Then simplify the model and approximate the average late payment fee in 2003.

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41. TELEVISION For the period 1980–2003, the percent p (in decimal form) of non-network television commercials in the United States that lasted 15 seconds can be modeled by

$$p = \frac{0.12x^2 - 0.48}{0.88x^2 + 100}$$

where x is the number of years since 1980. Rewrite the model so that it has only whole number coefficients. Then simplify the model and approximate the percent of non-network television commercials in 2003 that lasted 15 seconds.

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42. CAR RADIOS A company forecasts that the number R (in thousands) of digital car radios sold annually and the sales S (in millions of dollars) of digital car radios during the period 2004–2007 can be modeled by

$$R = 190x^2 + 55x + 140 \quad \text{and} \quad S = 170x + 60$$

where x is the number of years since 2004. Write and simplify a model that gives the average price P (in thousands of dollars) of a digital car radio as a function of x. Then predict the average price in 2007.

43. HOUSES The total number H of new single-family houses and the number W of new single-family wood houses in the United States during the period 1990–2002 can be modeled by

$$H = 34{,}500x + 913{,}000$$
$$\text{and } W = -20{,}200x + 366{,}000$$

where x is the number of years since 1990. Write and simplify a model that gives the percent p (in decimal form) of the houses that were wood houses as a function of x. *Describe* how the percent that were wood houses changed during the period 1990–2002.

44. AIRPORTS The total number A of airports and the number P of private airports in the United States during the period 1989–2002 can be modeled by

$$A = 0.18x^3 + 140x + 17{,}000 \quad \text{and} \quad P = 0.16x^3 + 120x + 12{,}000$$

where x is the number of years since 1989. Using only whole number coefficients, write a model that gives the percent p (in decimal form) of all airports that were private airports. Simplify the model and approximate the percent of airports in 2002 that were private airports.