PROBLEM SOLVING

EXAMPLE 4 on p. 373 for Exs. 45–48

45. MANUFACTURING At a factory, molten glass is poured into molds to make paperweights. Each mold is a rectangular prism with a height 4 inches greater than the length of each side of its square base. Each mold holds 63 cubic inches of molten glass. What are the dimensions of the mold?

TEXAS @HomeTutor for problem solving help at classzone.com

46. SWIMMING POOL You are designing a rectangular swimming pool that is to be set into the ground. The width of the pool is 5 feet more than the depth, and the length is 35 feet more than the depth. The pool holds 2000 cubic feet of water. What are the dimensions of the pool?

TEXAS @HomeTutor for problem solving help at classzone.com

GEOMETRY In Exercises 47 and 48, write a polynomial equation to model the situation. Then list the possible rational solutions of the equation.

47. A rectangular prism has edges of lengths x, $x - 1$, and $x - 2$ and a volume of 24.

48. A pyramid has a square base with sides of length x, a height of $2x - 5$, and a volume of 3.

49. MULTI-STEP PROBLEM From 1994 to 2003, the amount of athletic equipment E (in millions of dollars) sold domestically can be modeled by

$$E(t) = -10t^3 + 140t^2 - 20t + 18{,}150$$

where t is the number of years since 1994. Use the following steps to find the year when about \$20,300,000,000 of athletic equipment was sold.

a. Write a polynomial equation that can be used to find the answer.

b. List the possible whole-number solutions of the equation in part (a) that are less than 10.

c. Use synthetic division to determine which of the possible solutions in part (b) is an actual solution. Then calculate the year which corresponds to the solution.

50. EXTENDED RESPONSE Since 1990, the number of U.S. travelers to foreign countries F (in thousands) can be modeled by

$$F(t) = 12t^4 - 264t^3 + 2028t^2 - 3924t + 43{,}916$$

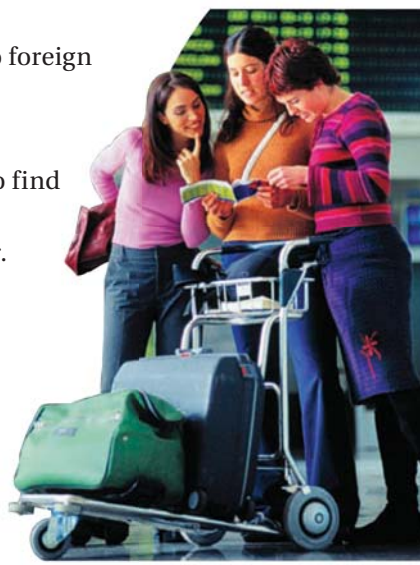
where t is the number of years since 1990. Use the following steps to find the year when there were about 56,300,000 travelers.

a. Write a polynomial equation that can be used to find the answer.

b. List the possible whole-number solutions of the equation in part (a) that are less than or equal to 10.

c. Use synthetic division to determine which of the possible solutions in part (b) is an actual solution.

d. Graph the function $F(t)$ and explain why there are no other reasonable solutions. Then calculate the year which corresponds to the solution.



= WORKED-OUT SOLUTIONS on p. WS1

= TAKS PRACTICE AND REASONING