NAME ______________________________ DATE ____________

Challenge: Skills and Applications

For use with pages 709–714

In Exercises 1–6, find the domain of the function.

Example: $y = \sqrt{\dfrac{1}{x - 7}}$

Solution: To find the domain, find all values of x for which the radicand is nonnegative. There is no value of x that makes the radicand zero, so solve:

$$\frac{1}{x - 7} > 0$$

Since 1 is positive, the radicand is positive when the denominator is $x - 7 > 0 \Longrightarrow x > 7$. The domain is the set of all numbers $x > 7$.

1. $y = \sqrt{\dfrac{1}{x + 9}}$

2. $y = \sqrt{\dfrac{-16}{3x + 8}}$

Example: $y = \sqrt{4 - x^2}$

Solution: To find the domain, find all values of x for which the radicand is nonnegative. $4 - x^2 \geq 0 \Longrightarrow (2 - x)(2 + x) \geq 0$. The x-intercepts of the graph are at $x = 2$ and $x = -2$. The function is zero at these points and the function changes sign there. Therefore, it is necessary to test points in the intervals $x < -2$, $-2 < x < 2$, and $x > 2$. When $x = -3$, $2 - x$ is positive, $2 + x$ is negative, and so the product is negative. Testing $x = 0$ and $x = 3$ similarly, we find that $4 - x^2 \geq 0$ when $-2 \leq x \leq 2$. The domain is the set of all numbers in this interval.

3. $y = \sqrt{x^2 - 5x - 14}$

4. $y = \sqrt{x^2 - 9x}$

5. $y = \sqrt{6x - x^2}$

6. $y = \sqrt{-x^2 + 8x - 15}$

7. If the price of an item increases from p_1 to p_2 over a period of 2 years, the rate of inflation i for the item can be modeled by $i = \sqrt{\dfrac{p_2}{p_1}} - 1$. If a gallon of milk costs \$1.09 in 1996 and \$1.29 in 1998, what was the rate of inflation for milk?