**47. BIOLOGY** Biologists studied two types of duck in the northern Great Plains of the United States from 1987 to 1990. The biologists found functions, given below, that model the number $y$ of breeding pairs of each type of duck in wetlands with area $x$ (in hectares).



Blue-winged teal: $y = 0.7\sqrt{x}$



Northern pintail: $y = 0.2\sqrt{x}$

**a.** Graph the functions in the same coordinate plane. Identify the domain and range of each function.

**b.** Find the area (to the nearest hectare) for 1 breeding pair of each type of duck.

**48.** ⬥ **TAKS REASONING** The amount of mozzarella cheese $y$ (in pounds per person) consumed in the United States for the period 1980–2001 can be modeled by $y = 2\sqrt{x} + 1$ where $x$ is the number of years since 1980.

**a. Graph** Graph the function and identify its domain and range.

**b. Apply** In what year was the amount of mozzarella cheese consumed equal to 2 pounds per person?

**c. Explain** In what year was the amount of mozzarella cheese consumed per person double the amount consumed per person in 1980? *Explain*.

**49. CHALLENGE** The flow rate $r$ (in gallons per minute) of water through a high-pressure water hose is given by $r = 29.7d^2\sqrt{p}$ where $d$ is the nozzle diameter (in inches) and $p$ is the nozzle pressure (in pounds per square inch). For what value of $d$ would the graph of the function be identical to the graph of the parent square root function? For what values of $d$ would the graph be a vertical stretch? a vertical shrink?

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**TAKS PRACTICE** at classzone.com

## MIXED REVIEW FOR TAKS

**50.** ⬥ **TAKS PRACTICE** The area of a rectangle is given by $3\ell^2 + 11\ell = 20$, in which $\ell$ is the rectangle's length. What is the length of the rectangle? *TAKS Obj. 2*

Ⓐ $\frac{1}{3}$    Ⓑ $\frac{4}{3}$    Ⓒ 4    Ⓓ 5

**51.** ⬥ **TAKS PRACTICE** $\triangle JKL$ is similar to $\triangle MNL$. What is $x$? *TAKS Obj. 8*

Ⓕ 7.47    Ⓖ 19.6

Ⓗ 26.25    Ⓙ Not here