SOLVING EQUATIONS **Solve the equation. Check for extraneous solutions.**

31. $\sqrt{x} + 2 = \sqrt{x - 1}$ **32.** $2 - \sqrt{x + 1} = \sqrt{x + 3}$ **33.** $\sqrt{5x + 9} + \sqrt{5x} = 9$

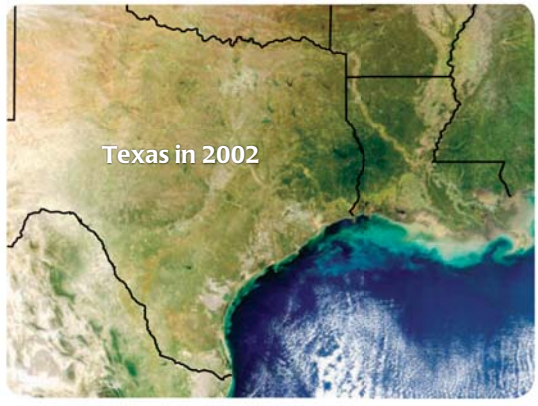
34. WRITING A student solves the equation $\sqrt{x + 2} = x$ and finds that $x = 2$ or $x = -1$. Without checking by substituting into the equation, which is the extraneous solution, 2 or -1? How do you know?

35. CHALLENGE Write a radical equation that has 3 and 4 as solutions.

PROBLEM SOLVING

EXAMPLE 5 on p. 731 for Exs. 36–38

36. FORESTS The dark green areas on the image shown represent regions with heavy foliage. In Texas, the area of land y (in millions of acres) that was covered by forest during the period 1907–2002 can be modeled by the function $y = 2.5\sqrt{143 - x}$ where x is the number of years since 1907. In what year were about 20 million acres of land covered by forest in Texas?



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37. PER CAPITA CONSUMPTION The annual banana consumption y (in pounds per person) in the United States for the period 1970–2000 can be modeled by the function $y = \sqrt{18x + 272}$ where x is the number of years since 1970. In what year were about 20 pounds of bananas consumed per person?

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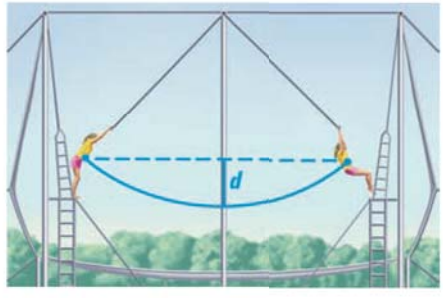
38. MULTI-STEP PROBLEM The velocity v (in meters per second) at which a trapeze performer swings can be modeled by the function $v = \sqrt{19.6d}$ where d is the difference (in meters) between the highest and lowest position of the performer's center of gravity during the swing.



a. A trapeze performer swings at a velocity of 5 meters per second. What is the value of d?

b. Suppose the performer jumps straight up off the starting board, increasing the velocity of the swing by 0.4 meter per second. By how many meters does the value of d increase?

39. BIOLOGY A bushbaby is a small animal that can perform standing jumps of over 2 meters. Scientists found that the time t (in seconds) in which a bushbaby must extend its legs in order to jump to a height h (in meters) is given by the function $t = 0.45\ell\sqrt{\frac{1}{h}}$ where ℓ is the length of the bushbaby's legs (in meters). A particular bushbaby has a leg length of 0.16 meter. The bushbaby can extend its legs in 0.05 second. About how high does the bushbaby jump? Round your answer to the nearest tenth of a meter.