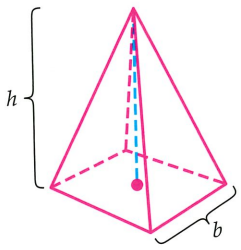
30. The surface area of the right square pyramid in the figure is given by $S = b\sqrt{b^2 + 4h^2}$. If the pyramid has height 10 feet and surface area 100 square feet, what is the length of a side b of its base?



In Exercises 31–34, assume that all letters represent positive numbers and solve each equation for the required letter.

31. $A = \sqrt{1 + \dfrac{a^2}{b^2}}$ for b

32. $T = 2\pi\sqrt{\dfrac{m}{g}}$ for g

33. $K = \sqrt{1 - \dfrac{x^2}{u^2}}$ for u

34. $R = \sqrt{d^2 + k^2}$ for d

In Exercises 35–42, solve each equation algebraically.

35. $x - 4x^{1/2} + 4 = 0$ [*Hint:* Let $u = x^{1/2}$.]

36. $x - x^{1/2} - 12 = 0$

37. $2x - \sqrt{x} - 6 = 0$

38. $3x - 11\sqrt{x} - 4 = 0$

39. $x^{2/3} + 3x^{1/3} + 2 = 0$ [*Hint:* Let $u = x^{1/3}$.]

40. $x^{2/3} - 4x^{1/3} + 3 = 0$

41. $x^{1/2} - x^{1/4} - 2 = 0$ [*Hint:* Let $u = x^{1/4}$.]

42. $x^{1/3} + x^{1/6} - 2 = 0$

In Exercises 43–46, solve each equation graphically.

43. $x^{3/5} - 2x^{2/5} + x^{1/5} - 6 = 0$

44. $x^{5/3} + x^{4/3} - 3x^{2/3} + x = 5$

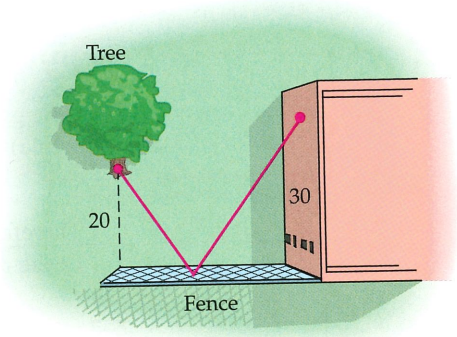
45. $x^{-3} + 2x^{-2} - 4x^{-1} + 5 = 0$

46. $x^{-2/3} - 3x^{-1/3} = 4$

47. A rope is to be stretched at uniform height from a tree to a 35-foot-long fence, which is 20 feet from the tree, and then to the side of a building at a point 30 feet from the fence, as shown in the figure.

(a) If 63 feet of rope is to be used, how far from the building wall should the rope meet the fence?

(b) How far from the building wall should the rope meet the fence if as little rope as possible is to be used?



48. Anne is standing on a straight road and wants to reach her helicopter, which is located 2 miles down the road from her, a mile from the road in a field (see the figure). She can run 5 miles per hour on the road and 3 miles per hour in the field. She plans to run down the road, then cut diagonally across the field to reach the helicopter.

(a) Where should she leave the road to reach the helicopter in exactly 42 minutes (.7 hour)?

(b) Where should she leave the road to reach the helicopter as soon as possible?