Solving Radical Equations: Some Base

Practice: Solving Radical Equations Some Base

1. \(x^2 - 3x + 2 = 0\)
2. \(\sqrt{x + 1} = 2\)
3. \(\sqrt{2x + 3} = 5\)
4. \(\sqrt{x - 2} = 4\)
5. \(\sqrt{x^2 + 4} = 6\)
6. \(\sqrt{x + 1} = 3\)
7. \(\sqrt{x - 2} = 5\)
8. \(\sqrt{x + 3} = 7\)
9. \(\sqrt{x - 4} = 8\)
10. \(\sqrt{x + 5} = 9\)

Answers:

1. \(x = 1, 2\)
2. \(x = 1\)
3. \(x = 4\)
4. \(x = 4\)
5. \(x = 10\)
6. \(x = 5, 9\)
7. \(x = 8\)
8. \(x = 2, 10\)
9. \(x = 8\)
10. \(x = 13\)
1.) The voltage \( V \) of an audio system's speaker can be represented by \( V = 4\sqrt{P} \), where \( P \) is the power of the speaker. An engineer wants to design a speaker with 400 watts of power. What will the voltage be?

\[
V = 4\sqrt{P} \\
V = 4\sqrt{400} \\
V = 80
\]

2.) The velocity \( v \) of an object dropped from a tall building is given by the formula \( v = \sqrt{64d} \) where \( d \) is the distance the object has dropped. Solve the formula for \( d \).

\[
v = \sqrt{64d} \\
\frac{v^2}{64} = d
\]

3.) The radius in inches of a balloon can be expressed as \( r = \sqrt[3]{\frac{3V}{4\pi}} \), where \( r \) is the radius and \( V \) is the volume of the balloon in cubic inches. If air is pumped to inflate the balloon from 500 cubic inches to 800 cubic inches, by how many has the radius increased?
   a. What was the radius of the balloon originally?
   b. What was the radius after inflating the balloon to 800 cubic inches?
   c. How can you use the 2 radii to find the amount of increase?

Subtract Big - Small ≈ 0.75 inches

4.) Boat builders share an old rule of thumb for sailboats. The maximum speed \( K \) in knots is about 1.35 times the square root of the length \( L \) in feet of the boat's waterline.
   a. Write an equation to describe the relationship between speed and length of the waterline.
   \[
   K = 1.35\sqrt{L}
   \]
   b. A customer is planning to order a sailboat with a maximum speed of 12 knots. How long should the waterline be?
   \[
   12 = 1.35\sqrt{L} \rightarrow \frac{12}{1.35} \approx 8.88 = \sqrt{L}
   \]
   \[
   \approx 3 = L
   \]
   About 11/3 ft longer

5.) The formula \( t = \sqrt{\frac{2s}{a}} \) shows the time \( t \) that any vehicle takes to travel a distance \( s \) at a constant acceleration \( a \), starting from rest. What is the difference in time between a car accelerating at 16m/s\(^2\) and one accelerating at 25m/s\(^2\) for a distance of 200 m?
   a. What is the time that a car accelerating at 16m/s\(^2\) takes to travel 200 m?
   b. What is the time that a car accelerating at 25m/s\(^2\) takes to travel 200 m?
   c. What is the difference between the 2 accelerations?