

Section 4.5 and 4.6: Solving Radical Equations

When we solve an equation, we "work backwards" to isolate the variable.

Recall: Solve for x : $3x - 4 = 8$

What operation would be "backwards" or "the inverse" of finding a square root?

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What operation would be "backwards" or "the inverse" of finding a cube root?

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Example 1:

Solving Radicals Involving Square Roots and Cube Roots.

Notice when the variable, x , is inside a square root.
Square both sides!

a).	Solve	Verify Solution	State Restrictions
	$\sqrt{3x} = 6$		

Note: Isolate the variable first!

b).	Solve	Verify Solution	State Restrictions
	$\sqrt{x-1} + 3 = 4$		

Remember: The value under square roots **must** be positive.

c).	Solve	Verify Solution	State Restrictions
	$\sqrt{x+2} = -3$		

Extraneous Root:



Notice when the variable, x , is inside a cube root.
Cube both sides!

d). Solve	Verify Solution	State Restrictions
$\sqrt[3]{2x-4} = 4$		

Note:

For cube roots, the radicand can be either positive, zero, or negative. Therefore, the equation is defined for all values of x , $x \in \mathbb{R}$.

e). Solve	Verify Solution	State Restrictions
$\sqrt[3]{x+1} = -3$		

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Your Turn:

f). Solve	Verify Solution	State Restrictions
$\sqrt{4x} = 8$		

g). Solve	Verify Solution	State Restrictions
$\sqrt{x+4} = 5$		



h). Solve	Verify Solution	State Restrictions
$7 + \sqrt{2x - 3} = 5$		

i). Solve	Verify Solution	State Restrictions
$\sqrt[3]{4x - 2} = -1$		



Modelling Real-World Applications

Example 1:

Collision investigators can approximate the initial velocity, v , in kilometers per hour, of a car based on the length, l , in meters, of a skid mark. The formula: $v = 12.6\sqrt{l} + 8, l \geq 0$ models the relationship.

What length of skid is expected if a car is travelling 50 km/h when the brakes are applied?

Example 2:

The surface area (S) of a sphere with radius r can be found using the equation: $S = 4\pi r^2$

a). Using the equation, how could you find the radius of a sphere given its surface area? Write the equation.

b). The surface area of a ball is 426.2 cm^2 . What is its radius?

p. 222-224 #1ac, 2ac, 4, 6, 8, 11, 12, 15
p. 215 # 1, 2, 3