

3.2 Solving Radical Equations

Objectives:

- Define a radical equation
- Solve a radical equation and determine extraneous solutions.

Radical equations are ones that have an expression containing a variable underneath a radical symbol. Exact solutions can be found using algebra due to the following fact:

If A and B represent algebraic expressions and $A = B$, then $A^n = B^n$ for every positive integer n .

This statement means that say: $x - 3 = 5$
then: $(x - 3)^2 = 5^2$
and: $(x - 3)^3 = 5^3$
 \vdots
 $(x - 3)^n = 5^n$

Extension 1

Summarize the above statement and example.

Extraneous solutions are possible when solving radical equations so all solutions must be checked into the original equation and confirmed.

Example 1

Solve $5 + \sqrt{3x - 11} = x$

<https://youtu.be/ft5HTHiOQQ4>

Example 2

Solve $\sqrt{2x - 5} = 1 + \sqrt{x - 3}$

<https://youtu.be/9i78yZB87VM>

Example 3

Solve $\sqrt{2x - 3} - \sqrt{x + 7} = 2$

<https://youtu.be/81t1Ew6s6sY>

Example 4

Solve $\sqrt[3]{x^2 - 1} = 2$

<https://youtu.be/QhvSuZKBUIc>

Example 5

Solve $\sqrt[3]{x^3 - 6x^2 + 2x + 3} = x - 1$

https://youtu.be/z_-r7H0FfIA

Solving Literal Equations

Literal equations are ones that involve multiple letters and minimal numbers. For example the

equation, $T = 2\pi\sqrt{\frac{m}{g}}$ is a literal equation. Most of you have had experience with these

types of equations in science or geometry class and called them formulas. Each variable represents some value which can be substituted in to find a missing value.

Example 6

Solve $y = \frac{ax + b}{cx + d}$ for x

<https://youtu.be/DnK3K0xKYUA>

Example 7

Solve $T = 2\pi\sqrt{\frac{m}{g}}$ for g

<https://youtu.be/YYTpc3DSjZk>