19.6 Solving Radical Equations

❖ The Principle of Powers

**Radical Equation:** an equation in which the variable appears in a radicand.

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**The Principle of Powers (Power Rule)**

If \( a = b \), then \( a^n = b^n \) for any exponent \( n \).

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**To solve an equation with a radical term:**

1) **Isolate** the radical expression on one side of the equation
2) Use the Principle of Powers (Power Rule)
3) Solve for the variable
4) **Check** answer(s) for extraneous solution

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**Ex. Solve.**

(a) \( \sqrt[3]{8m} + 2 = 6 \)  
(b) \( 9 + \sqrt[5]{m} + 3 = 2 \)

(c) \( 6 - \sqrt[5]{y} - 7 = 3 \)  
(d) \( -9 \sqrt[3]{2x} + 5 = 18 \)

(e) \( y = \sqrt[4]{4y + 1} + 5 \)  
(f) \( 3 + x = \sqrt{7 + 3x} \)
Equations with Two Radical Terms

Ex. Solve.

(a) \( \sqrt{2t - 7} = \sqrt{3t - 12} \)  

(b) \( \sqrt[4]{3x - 4} = \sqrt[4]{5x + 2} \)

(c) \( \sqrt[3]{3h - 4} = \sqrt[3]{h + 4} \)

Ex. (#52) After an accident, how do police determine the speed at which the car had been traveling? The formula \( r = 2\sqrt{5L} \) can be used to approximate the speed \( r \), in miles per hour, of a car that has left a skid mark of length \( L \), in feet. How far will a car skid at 100 mph?