

Bell Ringer - Solve the equation.

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$$\frac{2}{3}x + 12 = 4(x - 7) + 4$$

$$\frac{2}{3}x + 12 = 4x - 28 + 4$$

$$\frac{2}{3}x = 4x - 36$$

$$\frac{2}{3}x - 4x = -36$$

$$\frac{2}{3}x - \frac{12}{3}x = -36$$

$$-\frac{10}{3}x = -36$$

$$\frac{-3}{10} \cdot -\frac{10}{3}x = \frac{18}{1} \cdot \frac{-3}{10}$$

$$x = \frac{54}{5} = 10\frac{4}{5}$$

## Chapter 12-3 Solving Radical Equations Notes - Day 2

Quick Review: to undo the radical sign, you must square both sides of the equation.

Remember when solving for "x" from an " $x^2$ " term you must,

- 1) set the equation equal to zero
- 2) factor the quadratic, if not factorable, use the quadratic formula
- 3) check for solutions that do and do not work

Solve.

①

$$x = \sqrt{12 - x}$$

$$x^2 = \left( \sqrt{12 - x} \right)^2$$

← Square both sides

$$x^2 = 12 - x$$

← Quadratic  
set = to zero  
then factor

$$x^2 + x - 12 = 0$$

$$(x + 4)(x - 3) = 0$$

$$x = \cancel{-4} \text{ and } 3$$

- 4 is an extraneous solution; the result of a square root cannot be negative.

Solve.

②  $x = \sqrt{8 - 2x}$

Solve.

$$\textcircled{2} \quad x = \sqrt{8-2x}$$

$$x^2 = \left( \sqrt{8-2x} \right)^2$$

$$x^2 = 8 - 2x$$

$$x^2 + 2x - 8 = 0$$

$$(x+4)(x-2) = 0$$

$$x = -4 \text{ and } 2$$

- 4 is an extraneous solution; the result of a square root cannot be negative.

Solve.

③  $x = \sqrt{-3x - 2}$

Solve. ③  $(x)^2 = (\sqrt{-3x - 2})^2$

$$x^2 = -3x - 2$$

$$x^2 + 3x + 2 = 0$$

$$(x + 2)(x + 1) = 0$$

$$x = -2 \text{ or } -1$$

Both solutions are extraneous solutions; the result of a square root cannot be negative. Therefore, this quadratic has no real solutions.

Solve.

④

$$2x = \sqrt{16x - 15}$$

Solve.

$$(4) \quad 2x = \sqrt{16x - 15}$$

$$(2x)^2 = (\sqrt{16x - 15})^2$$

$$4x^2 = 16x - 15$$

Discriminant  
 $b^2 - 4ac$   
 $(-16)^2 - 4(4)(15)$   
16

$$4x^2 - 16x + 15 = 0$$

$$(2x - 5)(2x - 3) = 0$$

$$x = \frac{5}{2} \text{ and } \frac{3}{2}$$

Box Method

$$ac = 60$$

factors -10, -6

2x - 5

2x	$4x^2$	$-10x$
-3	$-6x$	15

Solve.

$$\frac{1}{2}x = \sqrt{x+3}$$

Solve.

$$\frac{1}{2}x = \sqrt{x+3}$$

$$\left(\frac{1}{2}x\right)^2 = \left(\sqrt{x+3}\right)^2$$

$$\frac{1}{4}x^2 = x + 3$$

$$\left(\frac{1}{4}x^2 - x - 3 = 0\right) \text{ Multiply all terms by 4 to clear the fraction.}$$

$$x^2 - 4x - 12 = 0$$

$$(x - 6)(x + 2) = 0$$

$$x = 6 \text{ and } -2$$

- 2 is an extraneous solution; the result of a square root cannot be negative.