8.5 Solving Radical Equations

Wednesday, June 19, 2019 9:50 AM

Steps:

1. Isolate the $\sqrt{\ }$
2. Square both sides to cancel the $\sqrt{\ }$
3. If only x... SOLVE!

   OR If x and x^2...
   - ① ZERO ✓
   - ② FACTOR ✓
   - ③ SOLVE!
4. Check for extraneous solutions by plugging x-values back into the original equation

$-\# = \sqrt{\ }$

Extraneous

ex $\sqrt{2x-4} + 3 = 9$

① $-3 \quad -3$

② $\left(\sqrt{2x-4}\right)^2 = 6^2$

③ $2x - 4 = 36$

$+4 \quad +4$

$\frac{2x}{2} = \frac{40}{2}$

$x = 20$

④ $\sqrt{2x-4} + 3 = 9$

$x = 20$

$\sqrt{2(20)-4} + 3 \stackrel{?}{=} 9$

$\sqrt{36} + 3 \stackrel{?}{=} 9$

$6 + 3 = 9$ ✓

Solution: $x = 20$

ex $x = \sqrt{3-2x}$

① Done ✓

② $x^2 = \left(\sqrt{3-2x}\right)^2$

$x^2 = 3 - 2x$

③ ZERO: $x^2 = 3 - 2x$

$+2x \quad +2x$

$x^2 + 2x = 3$

$-3 \quad -3$

FACTOR (TRI): $x^2 + 2x - 3 = 0$

$(x+3)(x-1) = 0$

SOLVE: $x+3=0$ $\quad x-1=0$

$-3 \quad -3 \quad +1 \quad +1$

$x = -3 \quad x = 1$

④ $x = \sqrt{3-2x}$

$-3 \stackrel{?}{=} \sqrt{3-2(-3)}$

$-3 = \sqrt{9}$

No!

$x = -3$

Extraneous Solution

$x = \sqrt{3-2x}$

$1 \stackrel{?}{=} \sqrt{3-2(1)}$

$1 = \sqrt{1}$ ✓

YES!

$x = 1$