

Day 73

7.5 NOTES: Solving Equations with Radicals

(ex) $\sqrt{x^2} = \sqrt{9}$

$x = \pm 3$

NOT sq. root eqs

(ex) $\sqrt{3} + x = 10$
 $-\sqrt{3} \quad -\sqrt{3}$

$x = 10 - \sqrt{3}$

square root equation:

$3 + \sqrt{x} = 10$
 $-3 \quad -3$
 $(\sqrt{x})^2 = (7)^2$

$x = 49$

Goal: to isolate the radical on one side of the equation, if possible

(ex) $\sqrt{5x-1} - 6 = 0$
 $+6 \quad +6$
Square both sides $(\sqrt{5x-1})^2 = 6^2$

$5x - 1 = 36$
 $+1 \quad +1$
 $5x = 37$
 $\frac{5x}{5} = \frac{37}{5}$

$x = \frac{37}{5}$

(ex) $\frac{2(x+3)^{3/2}}{2} = \frac{54}{2}$

$(x+3)^{3/2} = 27^{2/3}$

raise both sides to the reciprocal of the exponent

$x + 3 = 9$
 $-3 \quad -3$

$x = 6$

✓ For Extraneous Solutions!

(ex)

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

$$(\sqrt{x-3})^2 = (x-5)^2$$

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

$$x-3 = x^2 - 5x - 5x + 25$$

$$\begin{array}{r} x-3 \\ -x+3 \\ \hline \end{array} = \begin{array}{r} x^2 - 10x + 25 \\ -x^2 + 10x - 3 \\ \hline \end{array}$$

$$0 = x^2 - 11x + 28$$

$$0 = (x-7)(x-4)$$

$$x=7 \quad x=4$$

check:

$$\begin{array}{r} \sqrt{7-3} + 5 = 7 \\ \sqrt{4} \\ 2+5=7 \checkmark \end{array}$$

$$\begin{array}{r} \sqrt{4-3} + 5 = 4 \\ \sqrt{1} \\ 1+5 \neq 4 \end{array}$$

(ex)

$$\sqrt{3x+2} - \sqrt{2x+7} = 0$$

get radicals on opposite sides

$$(\sqrt{3x+2})^2 = (\sqrt{2x+7})^2$$

$$\begin{array}{r} 3x+2 = 2x+7 \\ -2x \quad -2x \\ \hline \end{array}$$

$$x = 5$$

$$\sqrt{17} - \sqrt{17} = 0 \checkmark$$

EX

$$(X+5)^{\frac{2}{3} \times \frac{3}{2}} = 4^{\frac{3}{2}}$$

$$X+5 = (\sqrt{4})^3$$

even root
 \pm sign

$$X+5 = (\pm 2)^3$$

$$X+5 = 8$$

-5 -5

$$X = 3$$

or

$$X+5 = -8$$

-5 -5

$$X = -13$$

P. 394-95 (2-12E, 13, 16-30E)