

# SOLVING RADICAL EQUATIONS (Pt. 1)

STEPS ① ISOLATE THE RADICAL

- IF MORE THAN ONE, ISOLATE THE  
MORE COMPLEX RADICAL

② SQUARE BOTH SIDES

③ IF RADICALS REMAIN REPEAT STEPS

① AND ②

④ SOLVE AND IDENTIFY ANY EXTRANEOUS

ROOTS AND REJECT THEM.

\* EXTRANEOUS ROOTS ARE SOLUTIONS (ROOTS) OF THE EQUATION WHICH DO NOT WORK IN THE ORIGINAL EQUATION \*

— You CANNOT TAKE THE SQUARE ROOT OF A NEGATIVE NUMBER.  $\therefore$  You MUST DETERMINE ANY RESTRICTIONS OF YOUR EQUATION FIRST.

THE SOLVE + CHECK  $\sqrt{x-5} - 3 = 1$  ANY

STATE ANY RESTRICTIONS OF THE VARIABLE

SOLVE RESTRICTIONS)

$$x-5 \geq 0$$
$$+5 \quad -5$$

$$x \geq 5$$

\* IF YOU MULTIPLY / DIVIDE

TRY A NEGATIVE NUMBER  
YOU MUST CHANGE THE  
DIRECTION OF THE  
INEQUALITY \*

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

$(\sqrt{x-5})^2 = (4)^2$

$x-5 = 16$   
 $+5 \quad +5$

$x = 21$  ✓

CHECK

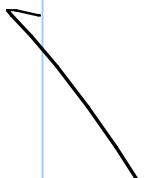
$\sqrt{x-5} - 3 = 1$

$\sqrt{21-5} - 3 = 1$

$$\sqrt{16} - 3 = 1$$

$$4 - 3 = 1$$

$$1 = 1$$



IE

$$\sqrt{x-7} + 4 = 0$$

$$x-7 \geq 0$$

$$x \geq 7$$

$$\sqrt{x-7} + 4 = 0$$

$$-4 = -4$$

$$\left(\sqrt{x-7}\right)^2 = (-4)^2$$

$$x-7 = 16$$

$$+7 \quad +7$$

$$x = 23$$

CHECK

$$\sqrt{x-7} + 4 = 0$$

$$\sqrt{23-7} + 4 = 0$$

$$\sqrt{16} + 4 = 0$$

$$4 + 4 = 0$$

$8 = 0$  X NO SOLUTION

THE  $-2\sqrt{6x+1} = 14$

SOLVING  $6x+1 \geq 0$   
 $-1 \quad -1$

$$\frac{6x}{6} \geq \frac{-1}{6}$$

$$x \geq -\frac{1}{6}$$

$$\cancel{\frac{2}{x}} \sqrt{6x+1} = \frac{14}{-2}$$

$$\left( \sqrt{6x+1} \right)^2 = (-7)^2$$

CHECK

$$6x+1 = 49$$
$$-1 \quad -1$$

$$-2\sqrt{6x+1} = 14$$

$$-2\sqrt{6 \cdot 8 + 1} = 14$$

$$\frac{6x}{4} = \frac{48}{4}$$

$$-2\sqrt{49} = 14$$

$$x = 8$$

$$-14 = 14$$

NO SOLN

$$\underline{\underline{x}} \quad x-3 = \sqrt{x-1}$$

$$x-1 \geq 0$$

$$x \geq 1$$

$$(x-3)^2 = (\sqrt{x-1})^2$$

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

$$x^2 - 3x - 3x + 9 = x - 1$$

$$x^2 - 6x + 9 = x - 1$$

$$-x \quad +1 \quad -x +1$$

$$x^2 - 7x + 10 = 0$$

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

$$x = 5$$

$$x = 2$$

REJECT

$$x-3 = \sqrt{x-1}$$

check

$$5-3 = \sqrt{5-1}$$

$$2-3 = \sqrt{2-1}$$

$$2 = \sqrt{4}$$

$$-1 = \sqrt{1}$$

$$2 = 2 \checkmark$$

$$-1 = 1$$

H/W Pg 269

# 1, 5, 6, 8