Name: _____ Date: _____

Learning Goal 5.4	Solve radical equations, identifying extraneous roots and restrictions to the domain.

Recall Order of Operations. Use it to solve the following linear equation.

Brackets
E
D
M
A
S

$5 + 2(2x - 1) = 13$

$-5 \quad -5$

$\frac{2}{2}(2x-1) = \frac{8}{2}$

$2x - 1 = 4$

$+1 \quad +1$

$\frac{2x}{2} = \frac{5}{2}$

$x = \frac{5}{2}$

Example State any restrictions on the variable, if any. Solve.

a. $5 + \sqrt{2x-1} = 12$

NPVS: $2x - 1 \geq 0$

$+1 \quad +1$

$\frac{2x}{2} \geq \frac{1}{2}$

$x \geq \frac{1}{2}$

$5 + \sqrt{2x-1} = 12$

$-5 \quad -5$

$(\sqrt{2x-1})^2 = (7)^2$

$2x - 1 = 49$

$+1 \quad +1$

$\frac{2x}{2} = \frac{50}{2}$

$x = 25 \geq \frac{1}{2}$ ✓

CHECK

$5 + \sqrt{2(25)-1} \stackrel{?}{=} 12$

$= 5 + \sqrt{49}$

$= 5 + 7$

$= 12$ ✓

b. $\sqrt{2x-1} + 5 = 2$

NPVS: $2x - 1 \geq 0$

$x \geq \frac{1}{2}$

$\sqrt{2x-1} + 5 = 2$

$-5 \quad -5$

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

$2x - 1 = 9$

$+1 \quad +1$

$\frac{2x}{2} = \frac{10}{2}$

$x = 5 \geq \frac{1}{2}$ ✓

✗ extraneous

CHECK

$\sqrt{2(5)-1} + 5 \stackrel{?}{=} 2$

$= \sqrt{9} + 5$

$= 3 + 5$

$= 8$ ✗

No Real Solutions.

Assignment p. 300 # 1 – 6, 7 (ab), 11, 14, 18, 19 Quiz Next Day!

c. $-8+\sqrt{\frac{3y}{5}}=-2$

NPVS: $\frac{3y}{5}\geq 0$, $y\geq 0$

$+8 \quad +8$

$\left(\sqrt{\frac{3y}{5}}\right)^2=(6)^2$

$5\times\frac{3y}{5}=36\times 5$

$\frac{3y}{3}=\frac{180}{3}$

$y=60 \geq 0$ ✓

CHECK

$-8+\sqrt{\frac{3(60)}{5}} \stackrel{?}{=} -2$

$=-8+\sqrt{36}$

$=-8+6$

$=-2$ ✓

d. $\sqrt[3]{3x-1}+7=3$

NPVS: none.

$\sqrt[3]{3x-1}+7=3$

$-7 \quad -7$

$\left(\sqrt[3]{3x-1}\right)^3=(-4)^3$

$3x-1=-64$

$+1 \quad +1$

$\frac{3x}{3}=\frac{-63}{3}$

$x=-21$

CHECK:

$\sqrt[3]{3(-21)-1}+7 \stackrel{?}{=} 3$

$=\sqrt[3]{-64}+7$

$=-4+7$

$=3$ ✓

Example An observer is in a hot air balloon that is attached to the top of a 200 metre tower whose base is at sea level. How high above the tower must the balloon be so the observer's distance to the horizon is 100 km?