

## 5.3 Radical Equations

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

$$\sqrt{2x-1} = 7$$

$$2x-1 = 49$$

$$2x = 50$$

$$x = 25$$

\* restrictions  $2x-1 \geq 0$   
 $2x \geq 1$   
 $x \geq \frac{1}{2}$

\* check  $5 + \sqrt{50-1} = 12$

$$5 + \sqrt{49} = 12$$

$$5 + 7 = 12 \quad \checkmark$$

$$x = 25$$

$$x = -5$$
$$x^2 = 25$$
$$\rightarrow x = \pm 5$$

Example 2  $n - \sqrt{5-n} = -7$  :

$$n+7 = \sqrt{5-n}$$

$$n^2 + 14n + 49 = 5 - n$$

$$n^2 + 15n + 44 = 0$$

$$(n+11)(n+4) = 0$$

↑

$$n+11=0$$

$$n=-11$$

↑

$$n+4=0$$

$$n=-4$$

check

$$n=-11$$

$$-11 - \sqrt{5+11} = -7$$

$$-11 - \sqrt{16} = -7$$

$$-11 - 4 = -7$$

no!

$$n=-4$$

$$-4 - \sqrt{5+4} = -7$$

$$-4 - \sqrt{9} = -7$$

$$-4 - 3 = -7$$

✓

$$\therefore \boxed{n=-4}$$

**Example 3** Solve  $7 + \sqrt{3x} = \sqrt{5x+4} + 5$

$$\begin{aligned}2 + \sqrt{3x} &= \sqrt{5x+4} \\4 + 3x + 4\sqrt{3x} &= 5x+4 \\4\sqrt{3x} &= 2x \\16(3x) &= 4x^2 \\48x &= 4x^2 \\0 &= 4x^2 - 48x \\0 &= 4x(x-12) \\&\downarrow \quad \downarrow \\4x &= 0 \quad x-12=0 \\x &= 0 \quad x=12\end{aligned}$$

check  $x=0$

$$7 + \sqrt{0} = \sqrt{4} + 5$$

$$7 = 2 + 5$$

✓

check  $x=12$

$$7 + \sqrt{36} = \sqrt{60+4} + 5$$

$$7 + 6 = 8 + 5$$

$$13 = 13$$

✓

$$\therefore x=0, x=12$$

Today: Do 4,5,6,8,10 pgs.300-301  
Tomorrow: 9, 11-19 pgs.301-302