

Day 5 Radical Equation

Note Title

20/11/2017

- I When solving these equations follow the simple guidelines:
- ① Solve for an restrictions on variable
 - ② Isolate the radical
 - ③ Square both sides eqn
 - ④ Check your solution if it is ALLOWED

e.g. 1 $5 + \sqrt{2x-1} = 12$ Restrictions

Solve $\sqrt{2x-1} = 12 - 5$ $2x-1 \geq 0$

$\sqrt{2x-1} = 7$ "The thing under $\sqrt{\quad}$ must be +"

"square up" $(\sqrt{2x-1})^2 = (7)^2$ $2x-1 \geq 0$

$2x-1 = 49$ $\frac{2x \geq 1}{2} \frac{1}{2}$

$2x = 50$

$x = 25$ is it ok? $x \geq \frac{1}{2}$

☺

e.g. 2 $n - \sqrt{5-n} = -7$ Restrictions:

$-\sqrt{5-n} = -7 - n$ $5-n \geq 0$

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

"square up!" $5-n = 49 + 14n + n^2$ Switch direction when \times or \div by a NEGATIVE

QUADRATIC $\rightarrow 0 = n^2 + 15n + 44$ $n \leq 5$

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

$n = -11, -4$ ☺

Both solutions meet restriction, test by substitution

"reject extraneous"

e.g. 3 Two square roots Two Restriction

$7 + \sqrt{3x} = \sqrt{5x+4} + 5$ $3x \geq 0$

"square up" $2 + \sqrt{3x} = \sqrt{5x+4}$ $x \geq \frac{0}{3}$

$(2 + \sqrt{3x})^2 = 5x+4$

$4 + 4\sqrt{3x} + 3x = 5x+4$ $5x+4 \geq 0$

"square up" $(4\sqrt{3x})^2 = (2x)^2$ $5x \geq -4$

$16 \cdot 3x = 4x^2$ $x \geq \frac{-4}{5}$

QUADRATIC $0 = 4x^2 - 48x$

$0 = 4x(x-12)$

$x = 0, 12$

CHECK

$7 + \sqrt{3(0)} = \sqrt{5(0)+4} + 5$	$7 + \sqrt{3(12)} = \sqrt{5(12)+4} + 5$
$7 = 7 \checkmark \text{ ☺}$	$13 = 13 \checkmark$

You try

$$\sqrt{3+j} + \sqrt{2j-1} = 5 \quad j \geq \frac{1}{2}$$

$$(\sqrt{2j-1})^2 = (5 - \sqrt{3+j})^2$$

$$2j-1 = 25 - 10\sqrt{3+j} + 3+j$$

$$(j-29)^2 = (-10\sqrt{3+j})^2$$

$$j^2 - 58j + 841 = 100(3+j)$$

$$j^2 - 58j + 841 = 300 + 100j$$

QUAD

$$j^2 - 158j + 541 = 0 \quad \leftarrow \text{UCLY}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{158 \pm \sqrt{(-158)^2 - 4(1)(541)}}{2}$$

$$x = \frac{158 \pm 150.9966}{2}$$

$$\boxed{154.5 \quad \& \quad 3.5}$$