

# Radical Eq & Inequalities

①  $(\sqrt{a-5})^2 = (a-7)^2$

$$\begin{array}{r} a-5 = a^2 - 14a + 49 \\ -a+5 \quad \quad -a \quad +5 \end{array}$$

$$a^2 - 15a + 54 = 0$$

$$(a-9)(a-6) = 0$$

$$a = 9, 6$$

$$\sqrt{9-5} = 9-7$$

$$2 = 2 \checkmark$$

$$\sqrt{6-5} = 6-7$$

$$1 = -1 \times$$

$$\boxed{a=9}$$

②  $1 = \sqrt{3x-8} - \sqrt{5-x}$

$$(1 + \sqrt{5-x})^2 = (\sqrt{3x-8})^2$$

$$(1 + \sqrt{5-x})(1 + \sqrt{5-x}) = 3x-8$$

$$1 + \sqrt{5-x} + \sqrt{5-x} + 5-x = 3x-8$$

$$\begin{array}{r} 6-x + 2\sqrt{5-x} = 3x-8 \\ -6+x \quad \quad +x-6 \end{array}$$

$$\frac{2\sqrt{5-x}}{2} = \frac{4x-14}{2}$$

$$(\sqrt{5-x})^2 = (2x-7)^2$$

$$5-x = 4x^2 - 28x + 49$$

$$\begin{array}{r} -5+x \quad \quad +x-49 \end{array}$$

$$4x^2 - 27x + 44 = 0$$

$$4x^2 - 16x - 11x + 44 = 0$$

$$4x(x-4) - 11(x-4)$$

$$(x-4)(4x-11) = 0$$

$$x = 4, \frac{11}{4}$$

$$\boxed{x=4}$$

176

16 11

Radical Equations & Inequalities

③  $y - \sqrt{2y+1} < 3$

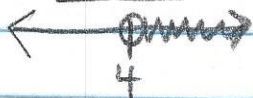
$-\sqrt{2y+1} < -3$

$(\sqrt{2y+1})^2 > 3^2$

$2y+1 > 9$

$2y > 8$

$y > 4$



$2y+1 \geq 0$

$2y \geq -1$

$y \geq -\frac{1}{2}$

$P=0$

$(a-b)^2 = (a-b)(a+b)$

$0 = (a-b)(a+b)$

$0 = (a-b)(a+b)$

$a, b = 0$

④  $\sqrt{3x+6} + 2 \leq 5$

$(\sqrt{3x+6})^2 \leq 3^2$

$3x+6 \leq 9$

$3x \leq 3$

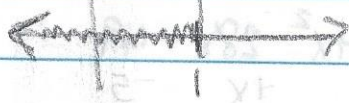
$x \leq 1$

$-2 \leq x \leq 1$

$3x+6 \geq 0$

$3x \geq -6$

$x \geq -2$



$4x^2 - 5x + 4 = 0$

$0 = 4x^2 - 5x + 4$

$4x(x-1) - 1(x-1)$

$0 = (4x-1)(x-1)$

$4x-1 = 0$

$4x = 1$

$x = \frac{1}{4}$

$$\textcircled{5} \quad 2 + \sqrt{4y-4} \leq 6$$

$$\quad \quad \quad -2 \quad \quad \quad -2$$

$$(\sqrt{4y-4})^2 \leq 4^2$$

$$4y-4 \leq 16$$

$$4y \leq 20$$

$$y \leq 5$$

$$\boxed{1 \leq y \leq 5}$$



$$4y-4 \geq 0$$

$$4y \geq 4$$

$$y \geq 1$$

$$\textcircled{6} \quad 1 + \sqrt{7x-3} > 3$$

$$\quad \quad \quad -1 \quad \quad \quad -1$$

$$(\sqrt{7x-3})^2 > 2^2$$

$$7x-3 > 4$$

$$7x > 7$$

$$\boxed{x > 1}$$



$$7x-3 \geq 0$$

$$7x \geq 3$$

$$x \geq \frac{3}{7}$$

$$0 \leq t - \mu$$

$$t \leq \mu$$

$$t \leq \mu$$

$$\textcircled{2} \quad \mu + \sqrt{\mu - t} + \sigma$$

$$\frac{\sigma}{\mu}$$

$$t \leq \mu + \sigma \sqrt{\mu - t}$$

$$\mu - t \leq \sigma^2 (\mu - t)$$

$$\mu - t \leq \sigma^2 \mu$$

$$\mu \leq \sigma^2 \mu$$

$$\mu \leq \sigma^2$$

$$\boxed{1 \leq \mu \leq 2}$$

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$$0 \leq x - \mu$$

$$x \leq \mu$$

$$x \leq \mu$$

$$\textcircled{3} \quad \mu + \sqrt{\mu - x} + \sigma$$

$$\frac{\sigma}{\mu}$$

$$x \leq \mu + \sigma \sqrt{\mu - x}$$

$$\mu - x \leq \sigma^2 (\mu - x)$$

$$\mu - x > \sigma^2 (\mu - x)$$

$$\mu - x > \sigma^2 \mu$$

$$\mu > \sigma^2 \mu$$

$$\mu > \sigma^2$$

$$\boxed{x > 1}$$

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