

① Solve $\frac{2}{x-1} - \frac{4}{x+5} = \frac{3}{x^2+4x-5}$

② Multiply $(5+\sqrt{2})^2$

③ Solve $x^2+23=10x$

$(x+5)(x-1)$
 $x = \frac{11}{2}$

$x \neq 1, -5$

$$\frac{8}{2} = 4 \quad \text{because} \quad 4 \cdot 2 = 8$$

$$\frac{15}{3} = 5 \quad \text{because} \quad 5 \cdot 3 = 15$$

$$\frac{0}{7} = 0 \quad \text{because} \quad 0 \cdot 7 = 0$$

$$\frac{7}{0} = a \quad a \cdot 0 = 7$$

$$\frac{0}{0} = 12 \quad 1 \cdot 0 = 0$$

$$(5 + \sqrt{2})^2$$

$$27 + 10\sqrt{2}$$

$$x^2 + 23 = 10x$$

$$x^2 - 10x + 23 = 0$$

$$(x - 1)(x - 23) = 0$$

$$x^2 + 23 = 10x \quad \text{Claim:}$$

$$(5 + \sqrt{2})^2 + 23 \stackrel{?}{=} 10(5 + \sqrt{2}) \quad \text{is solution.}$$

$$27 + \underline{10\sqrt{2}} + 23 \stackrel{?}{=} 50 + \underline{10\sqrt{2}}$$

$$x = 5 + \sqrt{2} \text{ is a sol.}$$

$$5 - \sqrt{2}$$

$$x^2 + 23 = 10x$$

$$x^2 - 10x + 23 = 0$$

$$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(1)(23)}}{2(1)}$$

$$= \frac{10 \pm \sqrt{100 - 92}}{2}$$

$$= \frac{10 \pm \sqrt{8}}{2}$$

$$= \frac{10 \pm 2\sqrt{2}}{2}$$

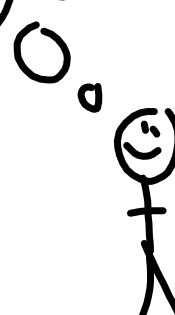
$$= \frac{10}{2} \pm \frac{2\sqrt{2}}{2}$$

$$= 5 \pm \sqrt{2}$$

If $ax^2 + bx + c = 0$

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

$a = 1$
 $b = -10$
 $c = 23$



$$\sqrt{8} = \sqrt{4 \cdot 2} = \sqrt{4} \sqrt{2} = 2\sqrt{2}$$

$$\frac{a \pm b}{c} = \frac{a}{c} \pm \frac{b}{c}$$

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

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

$$x = \frac{-10 \pm \sqrt{100 - 28}}{2}$$

$$x = \frac{-10 \pm \sqrt{72}}{2}$$

$$x = -5 \pm 3\sqrt{2}$$

$$x = -5 + 3\sqrt{2}, -5 - 3\sqrt{2}$$

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

$$(\sqrt{4x-7})^2 = (5)^2$$

$$4x-7 = 25$$

$$4x = 32$$

$$\boxed{x = 8}$$

Check: $\sqrt{4(8)-7} = 5$
 $\sqrt{25} = 5$

Solve

$$\text{If } \sqrt{4x-7} = x+3$$

$$(\sqrt{4x-7})^2 = (x+3)^2$$

$$\sqrt{5x-1} - 7 = 3$$

instead

~~$$(\sqrt{5x-1} - 7)^2 = 3^2$$~~

$$\sqrt{5x-1} = 10$$

etc.

~~$$(\sqrt{5x-1} - 7)(\sqrt{5x-1} - 7) = 9$$~~

~~$$5x-1 - 14\sqrt{5x-1} + 49 = 9$$~~