

1. Solve for x.

$$15 = 9 + \sqrt{x}$$

$$\frac{-9 \quad -9}{6^2 = (\sqrt{x})^2}$$

$$x = 36 \quad \checkmark$$

2. Solve for y.

$$\sqrt{y-8} + 5 = 7$$

$$(\sqrt{y-8})^2 = 2^2$$

$$y-8 = 4$$

$$y = 12 \quad \checkmark$$

3. Solve for z.

$$\sqrt{3z+4} = 5$$

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

$$3z + 4 = 25$$

$$3z = 21$$

$$z = 7 \quad \checkmark$$

4. Solve for w.

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

$$5w+3 = 4w+5$$

$$w = 2 \quad \checkmark$$

5. Solve for p.

$$\sqrt{p+16} + 4 = p$$

$$(\sqrt{p+16})^2 = (p-4)^2$$

$$p+16 = p^2 - 8p + 16$$

$$0 = p^2 - 9p$$

$$0 = p(p-9) \quad p = 0, 9 \quad \checkmark$$

6. Solve for m.

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

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

$$m-1 = m^2 - 14m + 49$$

$$0 = m^2 - 15m + 50$$

$$0 = (m-10)(m-5)$$

$$m = 10, 5 \quad \checkmark$$

7. Solve for n.

$$\sqrt{3n+10} = n+4$$

$$(\sqrt{3n+10})^2 = (n+4)^2$$

$$3n+10 = n^2 + 8n + 16$$

$$0 = n^2 + 5n + 6$$

$$0 = (n+3)(n+2)$$

$$n = -3, -2 \quad \checkmark$$

8. Solve for r.

$$\sqrt{10-13r} = r-4$$

$$(\sqrt{10-13r})^2 = (r-4)^2$$

$$10-13r = r^2 - 8r + 16$$

$$0 = r^2 + 5r + 6 \quad \text{no solution}$$

$$0 = (r+3)(r+2) \quad r = -3 \times$$

$$r = -2 \times$$

\* 9. Solve for k.

$$\sqrt{k-9} - \sqrt{k} = -1$$

$$(\sqrt{k-9})^2 = (\sqrt{k} - 1)^2 \rightarrow (\sqrt{k-1})(\sqrt{k-1})$$

$$k-9 = k - \sqrt{k} - \sqrt{k} + 1$$

$$k-9 = k - 2\sqrt{k} + 1$$

$$\frac{-10}{-2} = \frac{-2\sqrt{k}}{-2} \quad 5^2 = (\sqrt{k})^2$$

$$k = 25 \quad \checkmark$$

\* 10. Solve for h.

$$\sqrt{2h-5} = 1 - \sqrt{h-3}$$

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$$(\sqrt{2h-5})^2 = (1 - \sqrt{h-3})^2 \rightarrow (1 - \sqrt{h-3})(1 - \sqrt{h-3})$$

$$2h - 5 = 1 - 2\sqrt{h-3} + h - 3$$

$$\begin{array}{r} 2h - 5 = -2\sqrt{h-3} + h - 2 \\ -h + 2 \qquad \qquad \qquad -h + 2 \end{array}$$

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

$$h^2 - 6h + 9 = 4(h-3)$$

$$h^2 - 6h + 9 = 4h - 12$$

$$h^2 - 10h + 21 = 0$$

$$(h-7)(h-3) = 0$$

$$h = 7, 3$$

check

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

$$\sqrt{9} = 1 - \sqrt{4}$$

$$3 = 1 - 2 \quad \times \quad \text{so } h = 7 \text{ is an extraneous solution}$$

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

$$\sqrt{1} = 1 \quad \checkmark$$

so  $h = 3$  is a solution!