

8.7 continued

Simplify: Rationalize

$$\frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \boxed{\frac{\sqrt{3}}{3}}$$

$$\frac{3}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{3\sqrt{5}}{5}$$

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$$\frac{2(1-\sqrt{3})}{1+\sqrt{3}(1-\sqrt{3})}$$

Multiply by the conjugate

$$\frac{2-2\sqrt{3}}{1-\sqrt{3}+\sqrt{3}-3} = \frac{2-2\sqrt{3}}{-2} = \frac{1-\sqrt{3}}{-1}$$

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$$\frac{-14}{3-\sqrt{2}} \cdot \frac{(3+\sqrt{2})}{(3+\sqrt{2})}$$

$$\frac{-42 - 14\sqrt{2}}{9 + 3\sqrt{2} - 3\sqrt{2} - 2}$$

$$\frac{-42 - 14\sqrt{2}}{7}$$

$$-6 - 2\sqrt{2}$$

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8.8 Solving Radical Equations

Obj: 1. Solve radical eqns.

Solve & Check :

$$2\sqrt{x+5} = 8$$

$$\frac{2\sqrt{x+5}}{2} = \frac{8}{2}$$

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

$$x+5 = 16$$

$$\begin{array}{r} -5 \\ -5 \end{array}$$

$$\boxed{x=11}$$

Check:

$$2\sqrt{11+5} = 8$$

$$2\sqrt{16} = 8$$

$$2 \cdot 4 = 8$$

$$8 = 8 \checkmark$$

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$$\sqrt[3]{2x-1} = 6$$

$$(\sqrt[3]{2x-1})^3 = (6)^3$$

$$2x-1 = 4$$

$$+1 \quad +1$$

$$\frac{2x}{2} = \frac{5}{2}$$

$$x = \frac{5}{2}$$

Check:

$$\sqrt[3]{2\left(\frac{5}{2}\right)-1} = 6$$

$$\sqrt[3]{5-1} = 6$$

$$\sqrt[3]{4} = 6$$

$$3 \cdot 2 = 6$$

$$6 = 6 \quad \checkmark$$

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$$\sqrt[3]{x-5} = \sqrt[3]{7-x}$$

$$x-5 = 7-x$$

$$+x \quad +x$$

$$2x-5 = 7$$

$$+5 \quad +5$$

$$\frac{2x}{2} = \frac{12}{2}$$

$$x = 6$$

check:

$$\sqrt[3]{6-5} = \sqrt[3]{7-6}$$

$$\sqrt[3]{1} = \sqrt[3]{1} \quad \checkmark$$

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

$$x+2 = 5-2x$$

+2x +2x

$$3x+2 = 5$$

-2 -2

$$3x = 3$$

$$x = 1$$

check:

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

$$\sqrt{3} = \sqrt{3} \quad \checkmark$$

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$$\sqrt{x+1} + 3 = 2x$$

-3

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

$$x+1 = (2x-3)(2x-3)$$

$$x+1 = 4x^2 - 12x + 9$$

-x -1

$$0 = 4x^2 - 13x + 8$$

$$x = \frac{13 \pm \sqrt{(-13)^2 - 4(4)(8)}}{8}$$

$$x = \frac{13 \pm \sqrt{41}}{8}$$

$$\approx 2.43, 2.82$$

check by graphing

$$y = \sqrt{x+1} + 3$$

$$y = 2x$$

intersect @
x ≈ 2.43

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

$$\sqrt{x-1} = x^2 - 4x + 4$$

~~$-x+1$~~

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

$$x = \frac{5 \pm \sqrt{25 - 4(1)(5)}}{2}$$

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

$$\approx \textcircled{1.38}, \text{3.62}$$

Check:

$$y = \sqrt{x-1}$$

$$y = -x+2$$

intersect @ $x \approx 1.38$

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