

Alg 2: Homework 32

$$\begin{aligned} \textcircled{1} \quad 4 - \sqrt{x} &= 7 \\ -4 \quad \quad -4 \\ \hline -\sqrt{x} &= 3 \\ \sqrt{x} &= -3 \\ \boxed{\{\}} \end{aligned}$$

$$\textcircled{2} \quad \sqrt{2-2y} = y+3$$

$$\begin{aligned} (\sqrt{2-2y})^2 &= (y+3)^2 \\ 2-2y &= y^2+6y+9 \\ 0 &= y^2+8y+7 \\ 0 &= (y+7)(y+1) \end{aligned}$$

$$\begin{aligned} y+7=0 \quad \vee \quad y+1=0 \\ y=-7 \quad \vee \quad y=-1 \end{aligned}$$

Check (y = -7)

$$\begin{aligned} \sqrt{2-2(-7)} &\stackrel{?}{=} -7+3 \\ \sqrt{2+14} &\stackrel{?}{=} -4 \\ \sqrt{16} &\stackrel{?}{=} -4 \\ 4 &\neq -4 \\ \text{reject } y &= -7 \end{aligned}$$

Check (y = -1)

$$\begin{aligned} \sqrt{2-2(-1)} &\stackrel{?}{=} -1+3 \\ \sqrt{2+2} &\stackrel{?}{=} 2 \\ \sqrt{4} &\stackrel{?}{=} 2 \\ 2 &= 2 \end{aligned}$$

$$\boxed{\{-1\}}$$

$$\textcircled{3} \quad y = 3 + \sqrt{30-2y}$$

$$\begin{aligned} (y-3)^2 &= (\sqrt{30-2y})^2 \\ y^2-6y+9 &= 30-2y \\ y^2-4y-21 &= 0 \\ (y-7)(y+3) &= 0 \\ y-7=0 \quad \vee \quad y+3=0 \\ y=7 \quad \vee \quad y=-3 \end{aligned}$$

$$\boxed{\{7\}}$$

Check (y = 7)

$$\begin{aligned} 7 &\stackrel{?}{=} 3 + \sqrt{30-2(7)} \\ 7 &\stackrel{?}{=} 3 + \sqrt{30-14} \\ 7 &\stackrel{?}{=} 3 + \sqrt{16} \\ 7 &\stackrel{?}{=} 3 + 4 \\ 7 &= 7 \quad \checkmark \end{aligned}$$

Check (y = -3)

$$\begin{aligned} -3 &\stackrel{?}{=} 3 + \sqrt{30-2(-3)} \\ -3 &\stackrel{?}{=} 3 + \sqrt{30+6} \\ -3 &\stackrel{?}{=} 3 + \sqrt{36} \\ -3 &\stackrel{?}{=} 3 + 6 \\ -3 &\neq 9 \quad \text{reject } y = -3 \end{aligned}$$

$$(4) \quad \frac{13}{\sqrt{72}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{13\sqrt{2}}{\sqrt{144}} = \boxed{\frac{13\sqrt{2}}{12}}$$

or simplify $\sqrt{72}$ first:

$$\frac{13}{\sqrt{36 \cdot 2}} = \frac{13}{6\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{13\sqrt{2}}{6 \cdot 2} = \frac{13\sqrt{2}}{12}$$

$$(5) \quad 6\sqrt{\frac{4}{3}} = 6\frac{\sqrt{4}}{\sqrt{3}} = \frac{6 \cdot 2}{1 \cdot \sqrt{3}} = \frac{12}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{12\sqrt{3}}{3} = \boxed{4\sqrt{3}}$$

$$(6) \quad \sqrt{\frac{8}{3}} + \sqrt{\frac{2}{3}}$$

$$= \frac{\sqrt{8}}{\sqrt{3}} + \frac{\sqrt{2}}{\sqrt{3}} = \frac{\sqrt{8} + \sqrt{2}}{\sqrt{3}} = \frac{\sqrt{4\sqrt{2}} + \sqrt{2}}{\sqrt{3}}$$

$$= \frac{2\sqrt{2} + \sqrt{2}}{\sqrt{3}} = \frac{3\sqrt{2}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{3\sqrt{6}}{3} = \boxed{\sqrt{6}}$$

$$(7) \quad \frac{3}{(\sqrt{10}-2)} \cdot \frac{(\sqrt{10}+2)}{(\sqrt{10}+2)} = \frac{3(\sqrt{10}+2)}{10 + 2\sqrt{10} - 2\sqrt{10} - 4}$$

$$= \frac{3(\sqrt{10}+2)}{10-4} = \frac{3(\sqrt{10}+2)}{6}$$

$$= \boxed{\frac{\sqrt{10}+2}{2}}$$

$$(8) (\sqrt{7} + \sqrt{3})^2 = (\sqrt{7} + \sqrt{3})(\sqrt{7} + \sqrt{3})$$

$$= 7 + \sqrt{21} + \sqrt{21} + 3$$

$$= \boxed{10 + 2\sqrt{21}}$$

$$(9) |x + 4| < 2$$

$$-2 < x + 4 < 2$$

$$\begin{array}{ccc} -4 & -4 & -4 \end{array}$$

$$-6 < x < -2$$

$$\boxed{\{-6 < x < -2\}}$$

