

Section 6.6 Day 1 P. 456-457

① extraneous

② Add $\sqrt{9x-5}$ to both sides 1st

③ $\sqrt{5x+1} = 6$ check?

$$5x+1=36$$

$$5x=35$$

$$x=7$$

$$\sqrt{5 \cdot 7 + 1} = 6$$

$$\sqrt{36} = 6$$

$$6=6 \checkmark$$

④ $\sqrt{3x+10} = 8$

$$3x+10=64$$

$$3x=54$$

$$x=18$$

$$\sqrt{3 \cdot 18 + 10} = 8$$

$$\sqrt{64} = 8$$

$$8=8 \checkmark$$

⑤ $\sqrt{9x} + 11 = 14$

$$\sqrt{9x} = 3$$

$$9x = 9$$

$$x = 1$$

check?

$$\sqrt{9(1)} + 11 = 14$$

$$3 + 11 = 14$$

$$14 = 14 \checkmark$$

⑦ $-2\sqrt{24x} + 13 = -11$

$$-2\sqrt{24x} = -24$$

$$\sqrt{24x} = 12$$

$$24x = 144$$

$$x = 6$$

check?

$$-2\sqrt{24 \cdot 6} + 13 = -11$$

$$-11 = -11 \checkmark$$

$$\begin{aligned} \textcircled{9} \quad \sqrt{x-25} + 3 &= 5 \\ \sqrt{x-25} &= 2 \\ x-25 &= 4 \\ x &= 29 \end{aligned}$$

check?

$$\begin{aligned} \sqrt{29-25} + 3 &= 5 \\ \sqrt{4} + 3 &= 5 \\ 2 + 3 &= 5 \\ 5 &= 5 \checkmark \end{aligned}$$

$$\begin{aligned} \textcircled{11} \quad \sqrt{-2x+3} - 2 &= 10 \\ \sqrt{-2x+3} &= 12 \\ -2x+3 &= 144 \\ -2x &= 141 \\ x &= -\frac{141}{2} \end{aligned}$$

check?

$$\begin{aligned} \sqrt{-2\left(-\frac{141}{2}\right) + 3} - 2 &= 10 \\ \sqrt{144} - 2 &= 10 \\ 12 - 2 &= 10 \\ 10 &= 10 \checkmark \end{aligned}$$

$$\begin{aligned} \textcircled{13} \quad \sqrt[3]{x} - 10 &= -3 \\ \sqrt[3]{x} &= 7 \\ x &= 343 \end{aligned}$$

check

$$\begin{aligned} \sqrt[3]{343} - 10 &= -3 \\ 7 - 10 &= -3 \\ -3 &= -3 \checkmark \end{aligned}$$

$$\begin{aligned} \textcircled{15} \quad \sqrt[3]{12x} - 13 &= -7 \\ \sqrt[3]{12x} &= 6 \\ 12x &= 216 \\ x &= 18 \end{aligned}$$

check

$$\begin{aligned} \sqrt[3]{12 \cdot 18} - 13 &= -7 \\ 6 - 13 &= -7 \\ -7 &= -7 \checkmark \end{aligned}$$

$$\begin{aligned} (17) \quad -5\sqrt[3]{8x} + 12 &= -8 \\ -5\sqrt[3]{8x} &= -20 \\ \sqrt[3]{8x} &= 4 \end{aligned}$$

$$\begin{aligned} 8x &= 64 \\ x &= 8 \end{aligned}$$

check

$$\begin{aligned} -5\sqrt[3]{8 \cdot 8} + 12 &= -8 \\ -5 \cdot 4 + 12 &= -8 \\ -20 + 12 &= -8 \\ -8 &= -8 \\ &\checkmark \end{aligned}$$

$$\begin{aligned} (19) \quad \sqrt[3]{x-3} + 2 &= 4 \\ \sqrt[3]{x-3} &= 2 \\ x-3 &= 8 \\ x &= 11 \end{aligned}$$

check

$$\begin{aligned} \sqrt[3]{11-3} + 2 &= 4 \\ \sqrt[3]{8} + 2 &= 4 \\ 4 &= 4 \checkmark \end{aligned}$$

$$\begin{aligned} (21) \quad -4\sqrt[3]{x+10} + 3 &= 15 \\ -4\sqrt[3]{x+10} &= 12 \\ \sqrt[3]{x+10} &= -3 \\ x+10 &= -27 \\ x &= -37 \end{aligned}$$

check

$$\begin{aligned} -4\sqrt[3]{-37+10} + 3 &= 15 \\ -4\sqrt[3]{-27} + 3 &= 15 \\ -4(-3) + 3 &= 15 \\ 12 + 3 &= 15 \\ 15 &= 15 \checkmark \end{aligned}$$

$$\begin{aligned} (23) \quad 2x^{3/2} &= 16 \\ x^{3/2} &= 8 \\ x &= 8^{2/3} \\ x &= 4 \end{aligned}$$

check

$$\begin{aligned} 2(4)^{3/2} &= 16 \\ 16 &= 16 \checkmark \end{aligned}$$

$$\begin{aligned} \textcircled{25} \quad 9x^{3/5} &= 72 && \text{check} \\ x^{3/5} &= 8 && 9(32)^{3/5} = 72 \\ x &= 8^{5/3} && 72 = 72 \\ x &= 32 && \checkmark \end{aligned}$$

$$\begin{aligned} \textcircled{27} \quad \frac{1}{7}(x+9)^{3/2} &= 49 && \text{check} \\ (x+9)^{3/2} &= 343 && \frac{1}{7}(40+9)^{3/2} = 49 \\ x+9 &= 49 && 49 = 49 \checkmark \\ x &= 40 \end{aligned}$$

$$\begin{aligned} \textcircled{29} \quad \left(\frac{1}{3}x - 11\right)^{1/2} &= 5 \\ \frac{1}{3}x - 11 &= 25 \\ \frac{1}{3}x &= 36 \\ x &= 108 \checkmark \end{aligned}$$

$$\begin{aligned} \textcircled{31} \quad (3x+5)^{7/3} + 22 &= 150 \\ (3x+5)^{7/3} &= 128 \\ 3x+5 &= 8 \\ 3x &= 3 \\ x &= 1 \checkmark \end{aligned}$$

$\textcircled{33}$ Both sides must be raised to the 2.

6.6 Day 2 P. 457-458

(35)

$$(x-10)^2 = \sqrt{9x}$$

$$(x-10)(x-10) = 9x$$

$$x^2 - 20x + 100 = 9x$$

$$x^2 - 29x + 100 = 0$$

$$(x-25)(x-4) = 0$$

$$x = 25, 4$$

check

$$25-10 = \sqrt{9 \cdot 25}$$

$$15 = 15 \checkmark$$

$$4-10 = \sqrt{9 \cdot 4}$$

$$-6 \neq 6$$

(37)

$$\sqrt{21x+1} = x+5$$

$$21x+1 = x^2+10x+25$$

$$0 = x^2 - 11x + 24$$

$$0 = (x-8)(x-3)$$

$$x = 8, 3$$

check

$$\sqrt{21 \cdot 8 + 1} = 8 + 5$$

$$13 = 13 \checkmark$$

$$\sqrt{21 \cdot 3 + 1} = 3 + 5$$

$$8 \neq 8 \checkmark$$

(39)

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

$$x^2+4 = x^2+10x+25$$

$$4 = 10x+25$$

$$-21 = 10x$$

$$-\frac{21}{10} = x$$

$$\frac{21}{10} \checkmark$$

check

$$\sqrt{\left(-\frac{21}{10}\right)^2+4} = -\frac{21}{10}+5$$

$$2.9 = 2.9 \checkmark$$

$$(47) \quad \sqrt[4]{3-8x^2} = 2x$$

$$3-8x^2 = 16x^4$$

$$0 = 16x^4 + 8x^2 - 3$$

$$\begin{array}{r} -48x^4 \\ 16x^2 \quad -4x^2 \\ \hline 8x^2 \end{array}$$

$$0 = (16x^4 + 12x^2) + (-4x^2 - 3)$$

$$0 = 4x^2(4x^2 + 3) - 1(4x^2 + 3)$$

$$0 = (4x^2 + 3)(4x^2 - 1)$$

$$0 = (4x^2 + 3)(2x + 1)(2x - 1)$$

$$x = \cancel{-\frac{1}{2}}, \frac{1}{2}$$

check ✓

$$\sqrt[4]{3-8\left(-\frac{1}{2}\right)^2} = 2\left(-\frac{1}{2}\right)$$

$$\sqrt[4]{3-8\left(\frac{1}{2}\right)^2} = 2\left(\frac{1}{2}\right)$$

$$\left(\begin{array}{l} \sqrt[4]{1} = -1 \\ 1 \times -1 \end{array} \right)$$

$$1 = 1$$

$$(48) \quad \sqrt{32x-64} = 2x$$

$$32x-64 = 4x^2$$

(A)

check

$$0 = 4x^2 - 32x + 64$$

$$\sqrt{32 \cdot 4 - 64} = 2(4)$$

$$0 = 4(x^2 - 8x + 16)$$

$$8 = 8$$

✓

$$0 = 4(x-4)^2$$

$$x = 4$$

$$\begin{aligned} (45) \quad \sqrt{4x+1} &= \sqrt{x+10} \\ 4x+1 &= x+10 \\ 3x &= 9 \\ x &= 3 \checkmark \end{aligned}$$

$$\begin{aligned} \sqrt{4 \cdot 3 + 1} &= \sqrt{3 + 10} \\ \sqrt{13} &= \sqrt{13} \checkmark \end{aligned}$$

$$(47) \quad \sqrt{3x-8} + 1 = \sqrt{x+5}$$

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

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

$$\Rightarrow \sqrt{3x-8} = -2x+12$$

$$\sqrt{3x-8} = -x+6$$

$$3x-8 = (-x+6)(-x+6)$$

$$3x-8 = x^2 - 12x + 36$$

$$0 = x^2 - 15x + 44$$

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

$$x = \cancel{11}, 4 \checkmark$$

check

$$\sqrt{3(11)-8} + 1 = \sqrt{11+5}$$

$$\sqrt{25} + 1 = \sqrt{16}$$

$$5 + 1 = 4$$

$$6 \neq 4$$

$$\sqrt{3(4)-8} + 1 = \sqrt{4+5}$$

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

$$2 + 1 = 3$$

$$3 = 3$$

$$(49) \quad \sqrt{x+2} = 2 - \sqrt{x}$$

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

$$-2 = -4\sqrt{x}$$

$$\frac{1}{2} = \sqrt{x}$$

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

check

$$\sqrt{\frac{1}{4}+2} \stackrel{?}{=} 2 - \sqrt{\frac{1}{4}}$$

$$1.5 = 1.5$$

✓

$$(51) \quad \sqrt{2x+5} = \sqrt{x+2} + 1$$

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

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

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

check

$$\frac{x^2}{4} + \frac{2x}{2} + 1 = x+2$$

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

$$\sqrt{1} = \sqrt{0} + 1$$

$$\frac{x^2}{4} + x + 1 = x+2$$

$$3 = 0 + 1$$

$$3 = 3 \checkmark$$

$$\frac{x^2}{4} = 1$$

$$x^2 = 4$$

$$x = \pm 2$$

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

$$\sqrt{1} = \sqrt{0} + 1$$

$$1 = 1 \checkmark$$

$$(53) \quad 3\sqrt{x} + 5\sqrt{y} = 31$$

$$(+) \quad 5\sqrt{x} - 5\sqrt{y} = -15$$

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

$$\sqrt{x} = 2$$

$$x = 4$$

$$3\sqrt{4} + 5\sqrt{y} = 31$$

$$5\sqrt{y} = (31 - 3\sqrt{4})$$

$$\sqrt{y} = \frac{(31 - 3\sqrt{4})}{5}$$

$$\sqrt{y} = 5$$

$$y = 25$$

$$(4, 25)$$

(56)

$$v = \sqrt{2gh}$$

$$15 = \sqrt{2 \cdot 9.8 \cdot h}$$

$$15 = \sqrt{19.6h}$$

$$225 = 19.6h$$

$$11.48 = h$$

m

$$(57) \quad r = \sqrt{\frac{kt}{\pi(h_0 - h)}}$$

$$0.875 = \sqrt{\frac{0.04 \cdot t}{\pi(6.5 - 0)}}$$

$$0.765625 = \frac{0.04t}{6.5\pi}$$

$$15.63433219 = 0.04t$$

$$390.86 = t$$

min

$$(58) \quad l = 54d^{3/2}$$

$$3 = 54d^{3/2}$$

$$\frac{3}{54} = d^{3/2}$$

$$\left(\frac{3}{54}\right)^{2/3} = d$$

$$0.1511 = d$$