8.6 Practice Problems

Directions: Solve the equation. Check your answer.

1) $2+\sqrt{r}=11$

$-2 \quad -2$

$(\sqrt{r})^2=(9)^2$

$r=81$

Check: $2+\sqrt{81}=11$

$2+9=11$

$11=11$ ✓

2) $\sqrt[3]{x}-10=-3$

$+10 \quad +10$

$(\sqrt[3]{x})^3=7^3$

$x=343$

Check: $\sqrt[3]{343}-10=-3$

$7-10=-3$

$-3=-3$ ✓

3) $\sqrt[3]{5x-1}+6=10$

$-6 \quad -6$

$(\sqrt[3]{5x-1})^3=4^3$

$5x-1=64$

$+1 \quad +1$

$\frac{5x}{5}=\frac{65}{5}$

$x=13$

Check: $\sqrt[3]{5(13)-1}+6=10$

$\sqrt[3]{64}+6=10$

$4+6=10$

$10=10$ ✓

4) $-5\sqrt{x+1}+12=2$

$-12 \quad -12$

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

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

$x+1=4$

$-1 \quad -1$

$x=3$

Check: $-5\sqrt{3+1}+12=2$

$-5\sqrt{4}+12=2$

$-10+12=2$

$2=2$ ✓

5) $2\sqrt[3]{8x}+9=5$

$-9 \quad -9$

$\frac{2\sqrt[3]{8x}}{2}=\frac{-4}{2}$

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

$\frac{8x}{8}=\frac{-8}{8}$

$x=-1$

Check: $2\sqrt[3]{8(-1)}+9=5$

$2\sqrt[3]{-8}+9=5$

$2\cdot(-2)+9=5$

$-4+9=5$

$5=5$ ✓

6) $\frac{1}{2}x^{5/2}=16(2)$

$(x^{5/2})^{2/5}=32^{2/5}$

$x=4$

Check: $\frac{1}{2}(4)^{5/2}=16$

$\frac{1}{2}(32)=16$

$16=16$ ✓

7) $(x-2)^{3/4}=1$

$1/3 \quad 4/3$

$x-2=1$

$+2 \quad +2$

$x=3$

Check: $(3-2)^{3/4}=1$

$1^{3/4}=1$

$1=1$ ✓

8) $(8x)^{4/3}+44=300$

$-44 \quad -44$

$((8x)^{1/3})^{3/4}=256^{3/4}$

$8x=64$

$\frac{8x}{8}=\frac{64}{8}$

$x=8$

Check: $(8\cdot 8)^{4/3}+44=300$

$64^{4/3}+44=300$

$256+44=300$

$300=300$ ✓

9) $\left(\left(\frac{1}{3}x-11\right)^{1/2}\right)^2=5^2$

$\frac{1}{3}x-11=25$

$+11 \quad +11$

$3\left(\frac{1}{3}x\right)=3(36)$

$x=108$

$\left(\frac{1}{3}(108)-11\right)^{1/2}=5$

$(36-11)^{1/2}=5$

$25^{1/2}=5$

$5=5$ ✓

10) $(3x+43)^{2/3}+22=38$

$-22 \quad -22$

$\left((3x+43)^{2/3}\right)^{3/2}=16^{3/2}$

$3x+43=64$

$-43 \quad -43$

$3x=21$

$x=7$

$(3\cdot 7+43)^{2/3}+22=38$

$(21+43)^{2/3}+22=38$

$(64)^{2/3}+22=38$

$16+22=38$

$38=38$ ✓

11) $\left(\sqrt{\frac{x}{5}}\right)^2=\left(\sqrt{22-2x}\right)^2$

$5\left(\frac{x}{5}\right)=(22-2x)5$

$x=110-10x$

$+10x \quad +10x$

$\frac{11x}{11}=\frac{110}{11}$

$x=10$

$\sqrt{\frac{10}{5}}=\sqrt{22-2(10)}$

$\sqrt{2}=\sqrt{22-20}$

$\sqrt{2}=\sqrt{2}$ ✓

12) $\left(\sqrt{22-3x}\right)^2=(x-6)^2$

$22-3x=x^2-12x+36$

$-22 \quad +3x \quad +3x \quad -22$

$0=x^2-9x+14$

$0=(x-2)(x-7)$

$x-2=0 \qquad x-7=0$

$x=2 \qquad x=7$

$\sqrt{22-3(2)}=2-6$

$\sqrt{16}=-4$

$4\neq -4$

$\sqrt{22-3(7)}=7-6$

$\sqrt{1}=1$

$1=1$ ✓

13) $x=2+\sqrt{7x-6}$

$-2 \quad -2$

$(x-2)^2=\left(\sqrt{7x-6}\right)^2$

$x^2-4x+4=7x-6$

$-7x+6 \quad -7x+6$

$x^2-11x+10=0$

$(x-10)(x-1)=0$

$x-10=0 \qquad x-1=0$

$x=10 \qquad x\neq 1$

$10=2+\sqrt{7(10)-6}$

$10=2+\sqrt{64}$

$10=2+8$

$10=10$ ✓

$1=2+\sqrt{7(1)-6}$

$1=2+\sqrt{1}$

$1=2+1$

$1\neq 3$

14) $\left(\sqrt{b-7}\right)^2=\left(\sqrt{9-b}\right)^2$

$b-7=9-b$

$+b \quad +b$

$2b-7=9$

$+7 \quad +7$

$\frac{2b}{2}=\frac{16}{2}$

$b=8$

$\sqrt{8-7}=\sqrt{9-8}$

$\sqrt{1}=\sqrt{1}$

$1=1$ ✓

15) $\left(\sqrt{-5-6x}\right)^2=\left(5+\sqrt{-5-x}\right)^2$

$-5-6x=(5+\sqrt{-5-x})(5+\sqrt{-5-x})$

$-5-6x=25+10\sqrt{-5-x}+(-5-x)$

$-5-6x=20-x+10\sqrt{-5-x}$

$-20+x \quad -20+x$

$(-25-5x)^2=\left(10\sqrt{-5-x}\right)^2$

$625+250x+25x^2=100(-5-x)$

$25x^2+750x+625=-500-100x$

$+100x \quad +500 \quad +500 \quad +100x$

$25x^2+850x+1125=0$

$25(x^2+34x+45)=0$

$25(x+9)(x+5)=0$

$x+9=0 \qquad x+5=0$

$x=-9 \qquad x=-5$

$\sqrt{-5-6(-5)}=5+\sqrt{-5-(-5)}$

$\sqrt{49}=5+\sqrt{4}$

$7=5+2$

$7=7$ ✓

$\sqrt{-5-6(-5)}=5+\sqrt{-5-5}$

$\sqrt{25}=5+\sqrt{0}$

$5=5$ ✓

16) $1+\sqrt{6x-6}=x$

$-1 \quad -1$

$\left(\sqrt{6x-6}\right)^2=(x-1)^2$

$6x-6=x^2-2x+1$

$-6x+6 \quad -6x+6$

$0=x^2-8x+7$

$0=(x-7)(x-1)$

$0=x-7 \text{ or } x-1=0$

$x=7 \text{ or } x=1$

$1+\sqrt{6(7)-6}=7$

$1+\sqrt{36}=7$

$1+6=7$

$7=7$ ✓

$1+\sqrt{6(1)-6}=1$

$1+\sqrt{0}=1$

$1=1$ ✓