

## 9.2

1)  $\sqrt{x^2} = \sqrt{75}$

$$x = \pm\sqrt{75}$$

$$x = \pm\sqrt{5^2 \cdot 3}$$

$$x = \pm 5\sqrt{3}$$

3)  $x^2 + 5 = 13$

$$\frac{-5 \quad -5}{\sqrt{x^2} = \sqrt{8}}$$

$$x = \pm\sqrt{2^3}$$

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

5)  $3x^2 + 1 = 73$

$$\frac{-1 \quad -1}{\frac{3x^2}{3} = \frac{72}{3}}$$

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

$$x = \pm\sqrt{2^3 \cdot 3}$$

$$x = \pm 2\sqrt{2 \cdot 3}$$

$$x = \pm 2\sqrt{2 \cdot 3}$$

$$x = \pm 2\sqrt{6}$$

7)  $\sqrt[5]{(x+2)^5} = \sqrt[5]{-243}$

$$x + 2 = -3$$

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

9)  $(2x + 5)^3 - 6 = 21$

$$+6 \quad +6$$

$$\sqrt[3]{(2x + 5)^3} = \sqrt[3]{27}$$

$$2x + 5 = 3$$

$$\frac{-5 \quad -5}{\frac{2x}{2} = \frac{(-2)}{2}}$$

$$\frac{2x}{2} = \frac{(-2)}{2}$$

$$x = -1$$

11)  $(x - 1)^{\frac{2}{3}} = 16$

$$\sqrt{(\sqrt[3]{x-1})^2} = \sqrt{16}$$

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

$$x - 1 = \pm 64$$

$$\frac{+1 \quad +1}{x = 1 \pm 64}$$

$$x = 65, -63$$

13)  $(2 - x)^{\frac{3}{2}} = 27$

$$\sqrt[3]{(\sqrt{2-x})^3} = \sqrt[3]{27}$$

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

$$2 - x = 9$$

$$\frac{-2 \quad -2}{\frac{-x}{-1} = \frac{7}{-1}}$$

$$\frac{-x}{-1} = \frac{7}{-1}$$

$$x = -7$$

Check:  $(2 - (-7))^{\frac{3}{2}} = 27$

$$9^{\frac{3}{2}} = 27$$

$$(\sqrt{9})^3 = 27$$

$$3^3 = 27$$

$$27 = 27 \checkmark$$

15)  $(2x - 3)^{\frac{2}{3}} = 4$

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

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

$$2x - 3 = \pm 8$$

$$\frac{+3 \quad +3}{\frac{2x}{2} = \frac{3 \pm 8}{2}}$$

$$\frac{2x}{2} = \frac{3 \pm 8}{2}$$

$$x = \frac{11}{2}, -\frac{5}{2}$$

$$17) \left(x + \frac{1}{2}\right)^{-\frac{2}{3}} = 4$$

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

$$\left(\sqrt[3]{\frac{1}{x+\frac{1}{2}}}\right)^3 = (\pm 2)^3$$

$$\frac{1}{x+\frac{1}{2}} = \pm 8$$

$$\left(x + \frac{1}{2}\right) \frac{1}{x+\frac{1}{2}} = \pm 8 \left(x + \frac{1}{2}\right)$$

$$\frac{1}{\pm 8} = \frac{\pm 8(x+\frac{1}{2})}{\pm 8}$$

$$\pm \frac{1}{8} = x + \frac{1}{2}$$

$$\frac{-\frac{1}{2} \quad -\frac{1}{2}}{2 \quad 2}$$

$$-\frac{1}{2} \pm \frac{1}{8} = x$$

$$x = -\frac{3}{8}, -\frac{5}{8}$$

$$19) (x - 1)^{-\frac{5}{2}} = 32$$

$$\left(\frac{1}{x-1}\right)^{\frac{5}{2}} = 32$$

$$\sqrt[5]{\left(\sqrt{\frac{1}{x-1}}\right)^5} = \sqrt[5]{32}$$

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

$$(x - 1) \frac{1}{x-1} = 4(x - 1)$$

$$1 = 4x - 4$$

$$\frac{+4 \quad +4}{4 \quad 4}$$

$$\frac{5}{4} = \frac{4x}{4}$$

$$\frac{5}{4} = x$$

$$\text{Check: } \left(\frac{5}{4} - 1\right)^{-\frac{5}{2}} = 32$$

$$\left(\frac{1}{4}\right)^{-\frac{5}{2}} = 32$$

$$4^{\frac{5}{2}} = 32$$

$$(\sqrt{4})^5 = 32$$

$$2^5 = 32$$

$$32 = 32 \quad \checkmark$$

$$x = \frac{5}{4}$$

$$21) (3x - 2)^{\frac{4}{5}} = 16$$

$$\sqrt[4]{\left(\sqrt[5]{3x - 2}\right)^4} = \sqrt[4]{16}$$

$$\left(\sqrt[5]{3x - 2}\right)^5 = +2^5$$

$$3x - 2 = \pm 32$$

$$\frac{+2 \quad +2}{3x \quad 2 \pm 32}$$

$$x = \frac{34}{3}, -10$$

$$23) (4x + 2)^{\frac{3}{5}} = -8$$

$$\sqrt[3]{\left(\sqrt[5]{4x + 2}\right)^3} = \sqrt[3]{-8}$$

$$\left(\sqrt[5]{4x + 2}\right)^5 = (-2)^5$$

$$4x + 2 = -32$$

$$\frac{-2 \quad -2}{4x \quad -34}$$

$$x = -\frac{17}{2}$$

