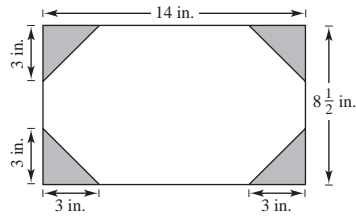


$$149. c = \sqrt{3^2 + 3^2} = \sqrt{9 + 9} = \sqrt{18}$$

$$\begin{aligned} \text{Equation: } P &= 2(8) + 2\left(2\frac{1}{2}\right) + 4(\sqrt{18}) \\ &= 16 + 5 + 12\sqrt{2} \\ &= 21 + 12\sqrt{2} \text{ inches} \end{aligned}$$



$$151. \quad 1.3 = 2\pi\sqrt{\frac{L}{32}}$$

$$\frac{1.3}{2\pi} = \sqrt{\frac{L}{32}}$$

$$\left(\frac{1.3}{2\pi}\right)^2 = \left(\sqrt{\frac{L}{32}}\right)^2$$

$$\frac{1.69}{4\pi^2} = \frac{L}{32}$$

$$\frac{1.69}{4\pi^2}(32) = L$$

$$1.3698624 = L \approx 1.37 \text{ feet}$$

$$155. \quad I = \sqrt{\frac{P}{R}}$$

$$15 = \sqrt{\frac{P}{40}}$$

$$15^2 = \left(\sqrt{\frac{P}{40}}\right)^2$$

$$225 = \frac{P}{40}$$

$$9000 \text{ watts} = P$$

$$153. \quad I = \sqrt{\frac{P}{R}}$$

$$5 = \sqrt{\frac{P}{20}}$$

$$5^2 = \left(\sqrt{\frac{P}{20}}\right)^2$$

$$25 = \frac{P}{20}$$

$$500 \text{ watts} = P$$

$$157. \quad v = \sqrt{2gh}$$

$$25 = \sqrt{2(32)h}$$

$$25^2 = \left(\sqrt{2(32)h}\right)^2$$

$$625 = 2(32)h$$

$$9.77 \text{ feet} \approx h$$

## Chapter Test for Chapter 5

$$\begin{aligned} 1. \text{ (a) } 16^{3/2} &= (\sqrt{16})^3 \\ &= 4^3 \\ &= 64 \end{aligned}$$

$$\begin{aligned} 2. \text{ (a) } 27^{-2/3} &= \frac{1}{27^{2/3}} \\ &= \frac{1}{9} \end{aligned}$$

$$\begin{aligned} 3. \text{ (a) } \left(\frac{x^{1/2}}{x^{1/3}}\right)^2 &= \frac{x}{x^{2/3}} \\ &= x^{1-2/3} = x^{1/3} \end{aligned}$$

$$4. \text{ (a) } \sqrt{\frac{32}{9}} = \sqrt{\frac{16 \cdot 2}{9}} = \frac{4}{3}\sqrt{2}$$

$$\begin{aligned} \text{(b) } \sqrt{5}\sqrt{20} &= \sqrt{5 \cdot 20} \\ &= \sqrt{100} \\ &= 10 \end{aligned}$$

$$\begin{aligned} \text{(b) } \sqrt{2}\sqrt{18} &= \sqrt{2 \cdot 18} \\ &= \sqrt{36} \\ &= 6 \end{aligned}$$

$$\begin{aligned} \text{(b) } 5^{1/4} \cdot 5^{7/4} &= 5^{1/4+7/4} \\ &= 5^{8/4} = 5^2 = 25 \end{aligned}$$

$$\text{(b) } \sqrt[3]{24} = \sqrt[3]{8 \cdot 3} = 2\sqrt[3]{3}$$

$$\begin{aligned} 5. (a) \sqrt{24x^3} &= \sqrt{4 \cdot 6 \cdot x^2 \cdot x} \\ &= 2x\sqrt{6x} \end{aligned}$$

$$6. \frac{3}{\sqrt{6}} = \frac{3}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{3\sqrt{6}}{6} = \frac{\sqrt{6}}{2}$$

Multiply the numerator and denominator of a fraction by a factor such that no radical contains a fraction and no denominator of a fraction contains a radical.

$$\begin{aligned} 8. \sqrt{5}(\sqrt{15x} + 3) &= \sqrt{75x} + 3\sqrt{5} \\ &= \sqrt{25 \cdot 3x} + 3\sqrt{5} \\ &= 5\sqrt{3x} + 3\sqrt{5} \end{aligned}$$

$$\begin{aligned} 10. 7\sqrt{27} + 14y\sqrt{12} &= 7\sqrt{9 \cdot 3} + 14y\sqrt{4 \cdot 3} \\ &= 21\sqrt{3} + 28y\sqrt{3} \\ &= 7\sqrt{3}(3 + 4y) \end{aligned}$$

$$\begin{aligned} 12. \sqrt{x^2 - 1} &= x - 2 \\ (\sqrt{x^2 - 1})^2 &= (x - 2)^2 \\ x^2 - 1 &= x^2 - 4x + 4 \\ 4x &= 5 \\ x &= \frac{5}{4} \end{aligned}$$

No solution

$$\begin{aligned} 13. \sqrt{x} - x + 6 &= 0 \\ (\sqrt{x})^2 &= (x - 6)^2 \\ x &= x^2 - 12x + 36 \\ 0 &= x^2 - 13x + 36 \\ 0 &= (x - 9)(x - 4) \\ 0 = x - 9 & \quad 0 = x - 4 \\ 9 = x & \quad 4 = x \end{aligned}$$

Not a solution

$$\begin{aligned} 14. 3x + \sqrt{-4y} &= 12 + 40i \\ 3x + 2\sqrt{yi} &= 12 + 40i \\ 3x = 12 & \quad 2\sqrt{y} = 40 \\ x = 4 & \quad \sqrt{y} = 20 \\ & \quad y = 400 \end{aligned}$$

$$16. (2 + 3i) - \sqrt{-25} = 2 + 3i - 5i = 2 - 2i$$

$$\begin{aligned} (b) \sqrt[4]{16x^5y^8} &= \sqrt[4]{16x^4xy^8} \\ &= 2xy^2\sqrt[4]{x} \end{aligned}$$

$$\begin{aligned} 7. 5\sqrt{3x} - 3\sqrt{75x} &= 5\sqrt{3x} - 3\sqrt{25 \cdot 3x} \\ &= 5\sqrt{3x} - 15\sqrt{3x} \\ &= -10\sqrt{3x} \end{aligned}$$

$$9. (4 - \sqrt{2x})^2 = 16 - 8\sqrt{2x} + 2x$$

$$\begin{aligned} 11. \sqrt{3y} - 6 &= 3 & \text{Check: } \sqrt{3(27)} - 6 &\stackrel{?}{=} 3 \\ \sqrt{3y} &= 9 & \sqrt{81} - 6 &\stackrel{?}{=} 3 \\ (\sqrt{3y})^2 &= 9^2 & 9 - 6 &\stackrel{?}{=} 3 \\ 3y &= 81 & 3 &= 3 \\ y &= 27 \end{aligned}$$

$$\begin{aligned} \text{Check: } \sqrt{\left(\frac{5}{4}\right)^2 - 1} &\stackrel{?}{=} \frac{5}{4} - 2 \\ \sqrt{\frac{25}{16} - \frac{16}{16}} &\stackrel{?}{=} \frac{5}{4} - \frac{8}{4} \\ \sqrt{\frac{9}{16}} &\stackrel{?}{=} -\frac{3}{4} \\ \frac{3}{4} &\neq -\frac{3}{4} \end{aligned}$$

$$\begin{aligned} \text{Check: } \sqrt{9} - 9 + 6 &\stackrel{?}{=} 0 \\ 3 - 9 + 6 &\stackrel{?}{=} 0 \\ 0 &= 0 \\ \sqrt{4} - 4 + 6 &\stackrel{?}{=} 0 \\ 2 - 4 + 6 &\stackrel{?}{=} 0 \\ 4 &\neq 0 \end{aligned}$$

$$\begin{aligned} 15. 27 - \sqrt{-16y} &= 9x - 4i \\ 27 - 4\sqrt{yi} &= 9x - 4i \\ 27 = 9x & \quad -4\sqrt{y} = -4 \\ 3 = x & \quad \sqrt{y} = 1 \\ & \quad y = 1 \end{aligned}$$

$$\begin{aligned} 17. (2 - 3i)^2 &= (2 - 3i)(2 - 3i) \\ &= 4 - 6i - 6i + 9i^2 \\ &= 4 - 12i - 9 \\ &= -5 - 12i \end{aligned}$$

$$\begin{aligned} 18. \sqrt{-16}(1 + \sqrt{4}) &= 4i(1 + 2i) \\ &= 4i + 8i^2 \\ &= -8 + 4i \end{aligned}$$

$$\begin{aligned} 19. (3 - 2i)(1 + 5i) &= 3 + 13i - 10i^2 \\ &= 3 + 13i + 10 \\ &= 13 + 13i \end{aligned}$$

$$20. \frac{5 - 2i}{i} = \frac{5 - 2i}{i} \cdot \frac{-i}{-i} = \frac{-5i + 2i^2}{-i^2} = -2 - 5i$$

$$\begin{aligned} 21. \quad v &= \sqrt{2gh} \\ 80 &= \sqrt{2(32)h} \\ 80 &= \sqrt{64h} \\ 80^2 &= (\sqrt{64h})^2 \\ 6400 &= 64h \\ 100 \text{ feet} &= h \end{aligned}$$