

# EXERCISES FOR APPENDIX: EXERCISES FOR RADICAL EXPRESSIONS AND EQUATIONS

**Question 1** In Exercises ?? - ??, perform the indicated operations and simplify.

**Problem 1.1**  $\sqrt{9x^2}$

$$3|x|$$

**Problem 1.2**  $\sqrt[3]{8t^3} = 2t$

**Problem 1.3**  $\sqrt{50y^6}$

$$5|y^3|\sqrt{2}$$

**Problem 1.4**  $\sqrt{4t^2 + 4t + 1}$

$$|2t + 1|$$

**Problem 1.5**  $\sqrt{w^2 - 16w + 64} = |w - 8|$

**Problem 1.6**  $\sqrt{(\sqrt{12x} - \sqrt{3x})^2 + 1}$

$$\sqrt{3x + 1}$$

**Problem 1.7**  $\sqrt{\frac{c^2 - v^2}{c^2}}$

$$\frac{\sqrt{c^2 - v^2}}{|c|}$$

**Problem 1.8**  $\sqrt[3]{\frac{24\pi r^5}{L^3}}$

$$\frac{2r\sqrt[3]{3\pi r^2}}{L}$$

**Problem 1.9**  $\sqrt[4]{\frac{32\pi\epsilon^8}{\rho^{12}}}$

$$\frac{2\epsilon^2\sqrt[4]{2\pi}}{|\rho^3|}$$

**Problem 1.10**  $\sqrt{x} - \frac{x+1}{\sqrt{x}}$

$$-\frac{1}{\sqrt{x}}$$

**Problem 1.11**  $3\sqrt{1-t^2} + 3t\left(\frac{1}{2\sqrt{1-t^2}}\right)(-2t)$

$$\frac{3-6t^2}{\sqrt{1-t^2}}$$

**Problem 1.12**  $2\sqrt[3]{1-z} + 2z\left(\frac{1}{3(\sqrt[3]{1-z})^2}\right)(-1)$

$$\frac{6-8z}{3(\sqrt[3]{1-z})^2}$$

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**Problem 1.13**  $\frac{3}{\sqrt[3]{2x-1}} + (3x) \left( -\frac{1}{3(\sqrt[3]{2x-1})^4} \right) (2)$

$$\frac{4x-3}{(2x-1)\sqrt[3]{2x-1}}$$

**Question 2** In Exercises ?? - ??, find all real solutions.

**Problem 2.1**  $(2x+1)^3 + 8 = 0$

$$x = -\frac{3}{2}$$

**Problem 2.2**  $\frac{(1-2y)^4}{3} = 27$

$$y = -1 \text{ (smaller solution)}$$

$$y = 2 \text{ (larger solution)}$$

**Problem 2.3**  $\frac{1}{1+2t^3} = 4$

$$t = -\frac{\sqrt[3]{3}}{2}$$

**Problem 2.4**  $\sqrt{3x+1} = 4$

$$x = 5$$

**Problem 2.5**  $5 - \sqrt[3]{t^2+1} = 1$

$$t = \pm 3\sqrt{7}$$

**Problem 2.6**  $x+1 = \sqrt{3x+7}$

$$x = 3$$

**Problem 2.7**  $y + \sqrt{3y+10} = -2$

$$y = -3$$

**Problem 2.8**  $3t + \sqrt{6-9t} = 2$

$$t = -\frac{1}{3} \text{ (smaller solution)}$$

$$t = \frac{2}{3} \text{ (larger solution)}$$

**Problem 2.9**  $2x-1 = \sqrt{x+3}$

$$x = \frac{5 + \sqrt{57}}{8}$$

**Problem 2.10**  $w = \sqrt[4]{12-w^2}$

$$w = \sqrt{3}$$

**Problem 2.11**  $\sqrt{x-2} + \sqrt{x-5} = 3$

$$x = 6$$

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**Problem 2.12**  $\sqrt{2x+1} = 3 + \sqrt{4-x}$

$x = 4$

**Question 3** In Exercises ?? - ??, solve each equation for the indicated variable. Assume all quantities represent positive real numbers.

**Problem 3.1** Solve for  $h$ :  $l = \frac{bh^3}{12}$ .

$$h = \sqrt[3]{\frac{12l}{b}}$$

**Problem 3.2** Solve for  $a$ :  $l_0 = \frac{5\sqrt{3}a^4}{16}$

$$a = \frac{2\sqrt[4]{l_0}}{\sqrt[4]{5\sqrt{3}}}$$

**Problem 3.3** Solve for  $g$ :  $T = 2\pi\sqrt{\frac{L}{g}}$

$$g = \frac{4\pi^2 L}{T^2}$$

**Problem 3.4** Solve for  $v$ :  $L = L_0\sqrt{1 - \frac{v^2}{c^2}}$ .

$$v = \frac{c\sqrt{L_0^2 - L^2}}{L_0}$$

**Question 4** In Exercises ?? - ??, rationalize the numerator or denominator, and simplify.

**Problem 4.1**  $\frac{4}{3 - \sqrt{2}}$

$$\frac{12 + 4\sqrt{2}}{7}$$

**Problem 4.2**  $\frac{7}{\sqrt[3]{12x^7}}$

$$\frac{7\sqrt[3]{18x^2}}{6x^3}$$

**Problem 4.3**  $\frac{\sqrt{x} - \sqrt{c}}{x - c}$

$$\frac{1}{\sqrt{x} + \sqrt{c}}$$

**Problem 4.4**  $\frac{\sqrt{2x+2h+1} - \sqrt{2x+1}}{h}$

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

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**Problem 4.5**  $\frac{\sqrt[3]{x+1} - 2}{x - 7}$

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

**Problem 4.6**  $\frac{\sqrt[3]{x+h} - \sqrt[3]{x}}{h}$

$$\frac{1}{(\sqrt[3]{x+h})^2 + \sqrt[3]{x+h}\sqrt[3]{x} + (\sqrt[3]{x})^2}$$