ASSIGNMENT 11

DYLAN ZWICK'S MATH

Section 7.2

In Exercises 1-18, simplify the radical.

7.2.1: $\sqrt{18} = 3\sqrt{2}$

7.2.2: $\sqrt{27} = 3\sqrt{3}$

7.2.3: $\sqrt{45} = 3\sqrt{5}$

7.2.5: $\sqrt{96} = 4\sqrt{6}$

7.2.7: $\sqrt{153} = 3\sqrt{17}$

7.2.10: $\sqrt{1176} = 14\sqrt{6}$

In Exercises 19-54, simplify the radical expression.

7.2.19: $\sqrt{9x^5} = 3x^2\sqrt{x}$

7.2.22: $\sqrt{32x} = 4\sqrt{2x}$

7.2.26: $\sqrt{125u^4v^6} = 5\sqrt{5}u^2|v^3|$

7.2.29: $\sqrt[3]{48} = 2\sqrt[3]{6}$

7.2.33: $\sqrt[3]{40x^5} = 2x^3\sqrt[3]{5x^2}$

7.2.35: $\sqrt[4]{324y^6} = 3|y|\sqrt[4]{4y^2}$

7.2.40: $-\sqrt{10^2} = 2|u|v\sqrt[4]{8v^3}$

7.2.42: $\sqrt[4]{128u^4v^7} = 2xy\sqrt[3]{2xy^2}$

7.2.49: $\sqrt[5]{\frac{32x^2}{y^5}} = \frac{2\sqrt[5]{x^2}}{y}$

In Exercises 55, 69, rationalize the denominator and simplify further, if possible.

7.2.55: $\sqrt{\frac{1}{3}} = \frac{\sqrt{3}}{3}$

7.2.69: $\frac{6}{\sqrt{3b^3}} = \frac{2\sqrt{3b}}{b^2}$

7.2.76: The time t(in seconds) for a pendulum of length L (in feet) to go through one complet cycle (its period) is given by $t = 2\pi\sqrt{\frac{L}{32}}$. Find the period of a pendulum whose length is 4 feet. (Round your answer to two decimal places.) 2.22 seconds

Section 7.3

In Exercises 1-46, combine the radical expressions, if possible.

7.3.1: $3\sqrt{2} - \sqrt{2} = 2\sqrt{2}$

7.3.2: $6\sqrt{5} - 2\sqrt{5} = 4\sqrt{5}$

7.3.4: $3\sqrt{7} + 2\sqrt{7} = 5\sqrt{7}$

7.3.7: $9\sqrt[3]{5} - 6\sqrt[3]{5} = 3\sqrt[3]{5}$

7.3.10: $13\sqrt{x} + \sqrt{x} = 14\sqrt{x}$

7.3.12: $9\sqrt[4]{t} - 3\sqrt[4]{t} = 6\sqrt[4]{t}$

7.3.13: $8\sqrt{2} + 6\sqrt{2} - 5\sqrt{2} = 9\sqrt{2}$

7.3.15: $\sqrt[4]{5} - 6\sqrt[4]{13} + 3\sqrt[4]{5} - \sqrt[4]{13} = 4\sqrt[4]{5} - 7\sqrt[4]{13}$

7.3.18: $5\sqrt{7} - 8\sqrt[4]{11} + \sqrt{7} - 9\sqrt[4]{11} = 6\sqrt{7} + \sqrt{3}$

7.3.21: $3\sqrt{45} + 7\sqrt{20} = 23\sqrt{5}$

7.3.24: $4\sqrt[4]{48} - \sqrt[4]{243} = 5\sqrt[4]{3}$

7.3.25: $5\sqrt{9x} - 3\sqrt{x} = 12\sqrt{x}$

7.3.26: $4\sqrt{y} + 2\sqrt{16y} = 12\sqrt{y}$

7.3.29: $\sqrt{25y} + \sqrt{64y} = 13\sqrt{y}$

7.3.30: $\sqrt[3]{16t^4} - \sqrt[3]{54t^4} = -t\sqrt[3]{2t}$

7.3.35: $\sqrt[3]{6x^4} + \sqrt[3]{48x} = (x+2)\sqrt{6x}$

7.3.38: $\sqrt{4y+12} + \sqrt{y+3} = 3\sqrt{y+3}$

7.3.39: $\sqrt{x^3 - x^2} + \sqrt{4x-4} = (x+2)\sqrt{x-1}$

7.3.46: $5\sqrt[3]{320x^5y^8} + 2x\sqrt{135x^2y^8} = 26xy^2\sqrt[3]{5x^2y^2}$

In Exercieses 47, 50, 53, perform the addition or subtraction and simplify your answer.

7.3.47: $\sqrt{5} - \frac{3}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$

7.3.50: $\sqrt{\frac{1}{5}} - \sqrt{45} = -\frac{14\sqrt{5}}{5}$

7.3.53: $\frac{2}{\sqrt{3x}} + \sqrt{3x} = \frac{(3x+2)\sqrt{3x}}{3x}$

Section 7.4

In Exercises 1-50, multiply and simplify.

7.4.1: $\sqrt{2} \cdot \sqrt{8} = 4$

7.4.4: $\sqrt{5} \cdot \sqrt{10} = 5\sqrt{2}$

7.4.9: $\sqrt{7}(3-\sqrt{7}) = 3\sqrt{7}-7$

7.4.10: $\sqrt{3}(4+\sqrt{3}) = 4\sqrt{3}+3$

7.4.14: $\sqrt{10}(\sqrt{5}+\sqrt{6}) = 5\sqrt{2}+2\sqrt{15}$

7.4.17: $\sqrt{y}(\sqrt{y}+4) = y+4\sqrt{y}$

7.4.23: $(\sqrt{5}+3)(\sqrt{5}-3) = \sqrt{15}-5\sqrt{5}+3\sqrt{3}-15$

7.4.25: $(\sqrt{20}+2)^2 = 8\sqrt{5}+24$

7.4.28: $(\sqrt[3]{9}+5)(\sqrt[3]{12}-5) = 3\sqrt[3]{4}-5\sqrt[3]{9}+5\sqrt[3]{12}-25$

7.4.35: $(\sqrt{2x}+10)^2 = 100+20\sqrt{2x}+2x$

7.4.40: $(\sqrt{7}-3\sqrt{3t})(\sqrt{7}+3\sqrt{3t}) = 7-27t$

7.4.43: $(\sqrt[3]{y}+2)(\sqrt[3]{y^2}-5) = y-5\sqrt[3]{y}+2\sqrt[3]{y^2}-10$

7.4.49: $2\sqrt[3]{x^4y^5}(\sqrt[3]{8x^{12}y^{14}}+\sqrt[3]{16xy^9}) = 4xy^3(x^4\sqrt[3]{x}+y\sqrt[3]{2x^2y^2}$

In Exercises 57-70, find the conjugate of the expression. Then multiply the expression by its conjugate and simplify.

7.4.57: $2+\sqrt{5} \to 2-\sqrt{5}, -1$

7.4.61: $3+\sqrt{15} \to \sqrt{15}-3, 6$

7.4.63: $\sqrt{x}-3 \to \sqrt{x}+3, x-9$

7.4.70: $3\sqrt{u}+\sqrt{3v} \to 3\sqrt{u}-\sqrt{3v}, 9u-3v$

In Exercises 71, 74, evaluate the function as indicated and simplify.

7.4.71: $f(x) = x^2-6x+1$
(a)$f(2-\sqrt{3}) = 2\sqrt{3}-4$ (b) $f(3-2\sqrt{2}) = 0$

7.4.74: $g(x) = x^2 - 4x + 1$
(a)$g(1+\sqrt{5}) = 3 - 2\sqrt{5}$ (b) $g(2-\sqrt{3}) = 0$

In Exercises 75-98, simplify the expression.

7.4.75: $\frac{6}{\sqrt{11}-2} = \frac{6(\sqrt{11}+2)}{7}$

7.4.81: $\frac{2}{\sqrt{6}+\sqrt{2}} = \frac{\sqrt{6}-\sqrt{2}}{2}$

7.4.85: $(\sqrt{7}+2) \div (\sqrt{7}-2) = \frac{4\sqrt{7}+11}{3}$

7.4.97: $\frac{\sqrt{u+v}}{\sqrt{u-v}-\sqrt{u}} = -\frac{\sqrt{u+v}(\sqrt{u-v}+\sqrt{u})}{v}$

7.4.98: $\frac{z}{\sqrt{u+z}-\sqrt{u}} = \sqrt{u+z} + \sqrt{u}, z \neq 0$

7.4.114(a): The ratio of the width of the Temple of Hephaestus to its height is approximately $\frac{2}{\sqrt{5}-1}$. This number is called the golden section. Rationalize the denominator for this expression. Approximate your answer, rounded to two decimal places.
$\frac{\sqrt{5}+1}{2}, 1.62$

Section 7.5

In Exercises 1-4, determine whether each value of x is a solution of the equation.

	Equation	Values of x
7.5.1:	$\sqrt{x} - 10 = 0$	(a) -4 N(b) -100 Y (c) $\sqrt{10}$ N (d) 100 Y

	Equation	Values of x
7.5.3:	$\sqrt[3]{x-4} = 4$	(a) -60 N (b) 68 N (c) 20 Y (d) 0 N

In Exercises 5-54, solve the equation and check your solution(s).

7.5.5: $\sqrt{x} = 12, 144$

7.5.8: $\sqrt{t} = 4, 16$

7.5.11: $\sqrt{y} - 7 = 0, 49$

7.5.14: $\sqrt{y} + 15 = 0, nosol.$

7.5.16: $\sqrt{x} - 10 = 0, 100$

7.5.19: $\sqrt{-3x} = 9, -27$

7.5.21: $\sqrt{5t} - 2 = 0, \frac{4}{5}$

7.5.24: $\sqrt{3 - 2x} = 2, -\frac{1}{4}$

7.5.27: $\sqrt[3]{y-3+4} = 216, 215$

7.5.29: $6\sqrt[4]{x+3} = 15, \frac{577}{16}$

7.5.31: $\sqrt{x+3} = \sqrt{2x-1}, 4$

7.5.33: $\sqrt{3y-5} - \sqrt{3y} = 0, nosolution$

7.5.36: $2\sqrt[3]{10-3x} = \sqrt[3]{2-x}, \frac{78}{23}$

7.5.39: $\sqrt{x^2-2} = x+4, -\frac{9}{4}$

7.5.44: $\sqrt{3x+7} = x+3, -2, -1$

7.5.46: $\sqrt{2x-7} = \sqrt{3x-12}, 5$

7.5.47: $\sqrt{z+2} = 1+\sqrt{z}, \frac{1}{4}$

7.5.48: $\sqrt{2x+5} = 7-\sqrt{2x}, \frac{242}{49}$

7.5.54: $\sqrt{x+3} - \sqrt{x-1} = 1, \frac{13}{4}$

7.5.55: $t^{\frac{3}{2}} = 8, 4$

7.5.58: $2x^{\frac{3}{4}} = 54, 81$

7.5.60: $(u-2)^{\frac{4}{3}} = 81, -25, 29$

7.5.85: The screen of a plasma television has a diagonal of 50 inches and a width of 43.75 inches. Draw a diagram of the plasma television and tind the length of the screen. $\frac{25\sqrt{15}}{4}$ inches