

## Chapter 6 Review: 6.1 – 6.5

6.1 - Simplify each radical expression. Use absolute value symbols when needed.

1.  $\sqrt{81x^4}$   $9x^2$

2.  $\sqrt{121y^{10}}$   $11|y^5|$

3.  $\sqrt[3]{8g^6}$   $2g^2$

4.  $\sqrt[3]{125x^9}$   $5x^3$

5.  $\sqrt[3]{243x^5y^{15}}$   $3xy^5$

6.  $\sqrt{(x-9)^3}$   $x-9$

7.  $\sqrt{25(x+2)^4}$   $5(x+2)^2$

8.  $\sqrt[3]{\frac{64x^9}{343}}$   $\frac{4x^3}{7}$

9.  $\sqrt{-0.008}$   $-.2$

10.  $\sqrt{\frac{x^4}{81}}$   $\frac{|x|}{3}$

11.  $\sqrt{36x^2y^6}$   $6|x||y^3|$

12.  $\sqrt[4]{(m-n)^4}$   $|m-n|$

6.2 - Simplify. Assume that all variables are positive.

13.  $\sqrt{36x^3}$   $6x\sqrt{x}$

14.  $\sqrt[3]{125y^2z^4}$   $5z\sqrt[3]{y^2z}$

15.  $\sqrt{18k^6}$   $3|k^3|\sqrt{2}$

16.  $\sqrt[3]{-16a^{12}-2a^4}\sqrt{2}$

17.  $\sqrt{x^2y^{10}z}$   $xy^5\sqrt{z}$

18.  $\sqrt[4]{256s^7t^{12}}$   $4st^3\sqrt[4]{s^3}$

19.  $\sqrt[3]{216x^4y^3}$   $6xy\sqrt[3]{x}$

20.  $\sqrt{75r^3}$   $5r\sqrt{3r}$

21.  $\sqrt[4]{625u^5v^8}$   $5uv^2\sqrt[4]{u}$

Multiply and simplify. Assume that all variables are positive.

22.  $\sqrt{4} \cdot \sqrt{6}$   $2\sqrt{6}$

23.  $\sqrt{9x^2} \cdot \sqrt{9y^5}$   $3x \cdot 3y^2\sqrt{y}$   $9xy^2\sqrt{y}$

24.  $\sqrt[3]{50x^2z^5} \cdot \sqrt[3]{15y^3z}$   $\sqrt[3]{2 \cdot 5 \cdot 5x^2z^5 \cdot 3 \cdot 5y^3z}$   $5z^2y\sqrt[3]{60x^2z}$   $\frac{14}{3}$

25.  $\sqrt{12x^2y} \cdot \sqrt{3xy^4}$   $\sqrt{36x^3y^5}$   $6xy^2\sqrt{xy}$

26.  $\sqrt[3]{-9x^2y^4} \cdot \sqrt[3]{12xy}$   $\sqrt[3]{-3 \cdot 3 \cdot 3 \cdot 2 \cdot 2x^3y^5}$   $-3xy\sqrt[3]{4y^2}$

27.  $7\sqrt{3y^2} \cdot 2\sqrt{6x^3y}$   $14\sqrt{18x^3y^3}$

Divide and simplify. Assume that all variables are positive.

26.  $\frac{\sqrt{75}}{\sqrt{3}}$   $\sqrt{25} = 5$

27.  $\frac{\sqrt{63xy^3}}{\sqrt{7y}}$   $\sqrt{9xy^2}$   $3y\sqrt{x}$

28.  $\frac{\sqrt{54x^5y^3}}{\sqrt{2x^2y}}$   $42xy\sqrt{2xy}$

Rationalize the denominator of each expression. Assume that all variables are positive.

27.  $\frac{\sqrt{y}}{\sqrt{5}\sqrt{5}}$   $\frac{\sqrt{5y}}{5}$

28.  $\frac{\sqrt{18x^2y}}{\sqrt{2y^3}}$   $\frac{\sqrt{9x^2y}}{\sqrt{y^3}}$   $\frac{\sqrt{9x^2y}}{y^2}$   $\frac{\sqrt{7xy^2}}{\sqrt{4x^2}}$   $\frac{\sqrt{2x}}{2x}$   $\frac{\sqrt[3]{14x^2y^2}}{2x}$

30.  $\frac{\sqrt{9x}}{2\sqrt{2}}$   $\frac{\sqrt{18x}}{2}$

31.  $\frac{\sqrt{xy}}{\sqrt{3x}} \cdot \frac{\sqrt{5x}}{\sqrt{3x}}$   $\frac{\sqrt{3xy}}{3x} = \frac{x\sqrt{3y}}{3x}$   $\frac{\sqrt{3y}}{3}$

32.  $\frac{x^2}{3y} \cdot \frac{\sqrt{3^2y^2}}{\sqrt{5^2y^2}}$   $= \frac{\sqrt{9x^2y^2}}{3y} =$

$$\frac{5\sqrt{2}}{7-2}$$

$$\frac{2\sqrt{7}-2\sqrt{2}+\sqrt{2}\cdot 7\cdot 7-\sqrt{2}\cdot 2\cdot 7}{2\sqrt{7}\cdot 2\sqrt{2}+7\sqrt{2}-2\sqrt{7}}$$

6.3 - Rationalize each denominator. Simplify the answer.

$$\frac{5+3\sqrt{2}-\sqrt{50}-\sqrt{20}}{5-2}$$

$$\frac{3-\sqrt{10}(\sqrt{5}+\sqrt{2})}{(\sqrt{5}-\sqrt{2})(\sqrt{5}+\sqrt{2})}$$

$$\boxed{\sqrt{5}-2\sqrt{2}}$$

$$34. \frac{2+\sqrt{14}(\sqrt{7}-\sqrt{2})}{(\sqrt{7}+\sqrt{2})(\sqrt{7}-\sqrt{2})}$$

$$5\sqrt{2}$$

$$35. \frac{2+\sqrt{x}}{\sqrt{x}} \cdot \frac{\sqrt[3]{x^2}}{\sqrt[3]{x^2}} = \frac{2\sqrt[3]{x^2} + \sqrt[3]{x^3}}{x}$$

$$\boxed{\frac{2\sqrt[3]{x^2} + x}{x}}$$

6.4 - Simplify each expression.

$$36. 125^{\frac{1}{3}} \sqrt[3]{125}$$

$$5$$

$$37. 64^{\frac{1}{2}} \sqrt{64}$$

$$8$$

$$38. 32^{\frac{1}{5}} \sqrt[5]{32}$$

$$2$$

Write each expression in radical form.

$$39. x^{\frac{4}{3}} \sqrt[3]{x^4}$$

$$40. (2y)^{\frac{1}{3}} \sqrt[3]{2y}$$

$$41. a^{15} a^{15/10} = a^{3/2} = \sqrt{a^3}$$

$$42. b^{\frac{1}{5}} \sqrt[5]{b}$$

$$43. z^{\frac{2}{3}} \sqrt[3]{z^2}$$

$$44. (ab)^{\frac{1}{4}} \sqrt[4]{ab}$$

Write each expression in exponential form.

$$45. \sqrt{x} x^{3/2}$$

$$46. \sqrt[3]{m} m^{1/3}$$

$$47. \sqrt{5y} (5y)^{1/2}$$

$$48. \sqrt[3]{2y^2} (2y^2)^{1/3}$$

$$49. (\sqrt[4]{b})^3 b^{3/4}$$

$$50. \sqrt{-6} (-6)^{1/2}$$

Write each expression in simplest form. Assume that all variables are positive.

$$51. \left(\frac{27x^6}{64y^4}\right)^{\frac{1}{3}} \frac{3x^2}{4y\sqrt[3]{y}}$$

$$52. \frac{x^{\frac{1}{2}}y^{\frac{1}{3}}}{x^{\frac{1}{3}}y^{\frac{1}{2}}} \frac{x^{1/6}y^{1/6}}{\sqrt{x}\cdot\sqrt[3]{y}} = \frac{\sqrt[6]{xy}}{\sqrt[6]{xy}}$$

$$53. y^{\frac{1}{2}} + y^{\frac{1}{2}} \sqrt[3]{y}$$

$$X^{\frac{18}{24}} = X^{3/4}$$

$$54. x^{\frac{1}{4}} \cdot x^{\frac{1}{4}} \cdot x^{\frac{1}{4}} (\sqrt[4]{x})^3$$

$$55. \left(\frac{y^{3/2}}{x}\right)^2 \left(\frac{x^{\frac{1}{2}}y}{x^{\frac{1}{2}}y^{\frac{1}{2}}}\right)^2 = \frac{y^3}{x^2}$$

$$56. \left(\frac{12x^8}{75y^{10}}\right)^{\frac{1}{2}} \frac{\sqrt{2}\cdot 2\cdot 3x^8}{\sqrt{5}\cdot 5\cdot 3y^{10}} \frac{2x^4}{5y^5}$$

6.5 - Solve.

$$\frac{(5\sqrt{x})^2(10)^2}{25x} = 100$$

$$X=4$$

$$57. 5\sqrt{x} + 2 = 12$$

$$58. \sqrt[3]{3x-8} = 7$$

$$3\sqrt[3]{x} = 15$$

$$9x = 225$$

$$X = \frac{225}{9} = \frac{75}{3}$$

$$59. \sqrt{4x} + 2 = 8$$

$$\sqrt{4x} = 6$$

$$4x = 36$$

$$X = 9$$

$$60. (\sqrt{2x-5})(7)^2$$

$$2x-5=49$$

$$2x=54$$

$$X=27$$

$$61. \sqrt{3x-3} - 6 = 0$$

$$\sqrt{3x-3} = 6$$

$$3x-3=36$$

$$3x=39$$

$$X=13$$

$$62. \sqrt{5-2x} + 5 = 12$$

$$\sqrt{5-2x} = 7$$

$$5-2x=49$$

$$-2x=44$$

$$X=-22$$

$$\sqrt{3x-2} = 7$$

$$3x-2=49$$

$$3x=51$$

$$X=51/3$$

$$X=17$$

$$63. \sqrt{3x-2} - 7 = 0$$

$$64. \sqrt{4x+3} + 2 = 5$$

$$\sqrt{4x+3} = 3$$

$$4x+3=9$$

$$4x=6$$

$$X=3/2$$

$$65. \sqrt{33-3x} = 3$$

$$33-3x=9$$

$$-3x=-24$$

$$X=8$$

$$66. \sqrt[3]{2x+1} = 3$$

$$2x+1=27$$

$$2x=26$$

$$X=13$$

$$67. \sqrt[3]{13x-1} - 4 = 0$$

$$\sqrt[3]{13x-1} = 4$$

$$13x-1=64$$

$$13x=65$$

$$68. \sqrt[3]{2x-4} = -2$$

$$2x-4=-8$$