Name Key Period ____

Algebra 2 - Chapter 6 Review Worksheet

Section 6-2

Simplify each radical expression.

1. $\sqrt{36x^4y^3}$ → $6x^2y\sqrt{y}$

2. $\sqrt[4]{81a^{11}b^2c^{20}}$ → $3a^2c^5\sqrt[4]{a^3b^2}$

3. $\sqrt[5]{-32k^5}$ → $-2k$

4. $\sqrt[4]{m^{18}n^8p^{26}}$ → $m^4n^2p^6\sqrt[4]{m^2p^2}$

5. $\sqrt[3]{-27b^4c^5}$ → $-3bc\sqrt[3]{bc^2}$

6. $\sqrt[3]{\frac{54h^{11}}{8g^9}}$ → $\frac{\sqrt[3]{3\cdot3\cdot3\cdot2h^{11}}}{\sqrt[3]{2\cdot2\cdot2g^9}}$ → $\frac{3h^3\sqrt[3]{2h^2}}{2g^3}$

54 → 2, 27 → 9, 3 → 3, 3

7. $\sqrt[4]{\frac{w^{15}}{16v^{12}}}$ → $\frac{w^3\sqrt[4]{w^3}}{2v^3}$

8. $5\sqrt{3x^4}\cdot\sqrt{24x^3}$ → $5\sqrt{3\cdot24x^7}$ → $5\sqrt{3\cdot3\cdot2\cdot2\cdot2x^7}$ → $10x^3\sqrt{9x}$

9. $\frac{\sqrt{80}}{\sqrt{5p^4}}\ \frac{\sqrt{16}}{\sqrt{p^4}}$ → $\frac{4}{p^2}$

10. $-2\sqrt{4ab^9}\cdot6\sqrt{18a^2b}$ → $-12\sqrt{2\cdot2\cdot3\cdot3\cdot2a^3b^{10}}$ → $-12\cdot2\cdot3ab^5\sqrt{2a}$ → $-72ab^5\sqrt{2a}$

11. $\frac{\sqrt{18x^5y^7}}{\sqrt{2x}}$ → $\sqrt{9x^4y^7}$ → $3x^2y^3\sqrt{y}$

12. $\sqrt{5u^3v}\cdot\sqrt{20uv^4}$ → $\sqrt{5\cdot5\cdot2\cdot2u^4v^5}$ → $5\cdot2u^2v^2\sqrt{v}$ → $10u^2v^2\sqrt{v}$

Section 6-3

Simplify each radical expression.

13. $2\sqrt{7}+3\sqrt{7}$ → $5\sqrt{7}$

14. $\sqrt{32}-\sqrt{8}$ → $4\sqrt{2}-2\sqrt{2}$ → $2\sqrt{2}$

15. $\sqrt{7x}+\sqrt{28x}$ → $\sqrt{7x}+2\sqrt{7x}$ → $3\sqrt{7x}$

48 → 6, 8 → 2, 3

16. $\sqrt[3]{27}+\sqrt[3]{48}$ → $3+\sqrt[3]{2\cdot2\cdot2\cdot3}$ → $3+2\sqrt[3]{6}$

17. $8\sqrt{45}-3\sqrt{80}$ → $8\cdot3\sqrt{5}-3\cdot4\sqrt{5}$ → $24\sqrt{5}-12\sqrt{5}$ → $12\sqrt{5}$

18. $\sqrt[3]{5}-\sqrt{20}+8\sqrt[3]{5}$ → $\sqrt[3]{5}-2\sqrt{5}+8\sqrt[3]{5}$ → $9\sqrt[3]{5}-2\sqrt{5}$

80 → 2, 40 → 2, 20 → 2, 10 → 2, 5

19. $3\sqrt{18}-2\sqrt{72}$ → $3\cdot3\sqrt{2}-2\cdot6\sqrt{2}$ → $9\sqrt{2}-12\sqrt{2}$ → $-3\sqrt{2}$

20. $7\sqrt[4]{3}-\sqrt[4]{48}$ → $7\sqrt[4]{3}-2\sqrt[4]{3}$ → $5\sqrt[4]{3}$

21. $3\sqrt{w}+\sqrt{w}-5\sqrt{w}$ → $-1\sqrt{w}$

72 → 9, 8, 3, 3, 2, 2, 2

22. $(3\sqrt{5})(-2\sqrt{7})$ → $-6\sqrt{35}$

23. $(-6\sqrt[3]{2})(5\sqrt[3]{8})$ → $-30\sqrt[3]{16}$ → $-30\cdot2\sqrt[3]{2}$ → $-60\sqrt[3]{2}$

24. $(6-\sqrt{7})(1+\sqrt{7})$ → $6+6\sqrt{7}-\sqrt{7}-7$ → $-1+5\sqrt{7}$

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25. $(5-\sqrt{2})^2$

$(5-\sqrt{2})(5-\sqrt{2})$

$25-5\sqrt{2}-5\sqrt{2}+2$

$\boxed{27-10\sqrt{2}}$

26. $(3\sqrt{5}-2)(3\sqrt{5}+4)$

$9(5)+12\sqrt{5}-6\sqrt{5}-8$

$45+6\sqrt{5}-8$

$\boxed{37+6\sqrt{5}}$

27. $\frac{\sqrt{7}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$\frac{\sqrt{14}}{2}$

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

$\frac{10+5\sqrt{3}}{2-3} = \frac{10+5\sqrt{3}}{-1}$

$\boxed{-10-5\sqrt{3}}$

29. $\frac{3\sqrt{2}}{(2-4\sqrt{3})} \frac{(2+4\sqrt{3})}{(2+4\sqrt{3})}$

$\frac{6\sqrt{2}+12\sqrt{6}}{4-16(3)} = \frac{6\sqrt{2}+12\sqrt{6}}{4-48}$

$= \frac{6\sqrt{2}+12\sqrt{6}}{-44}$

$\boxed{\frac{3\sqrt{2}+6\sqrt{6}}{-22}}$

30. $\frac{(3-\sqrt{5})}{(1+\sqrt{2})} \frac{(1-\sqrt{2})}{(1-\sqrt{2})}$

$\frac{3-3\sqrt{5}-\sqrt{5}+\sqrt{10}}{1-2}$

$\frac{3-4\sqrt{5}+\sqrt{10}}{-1}$

$\boxed{-3+4\sqrt{5}-\sqrt{10}}$

Section 6-4

Write each exponential expression in simplest form.

31. $\frac{n^{-3}}{n^8}$ $\boxed{\frac{1}{n^{11}}}$

32. $81^{\frac{3}{4}}$

$(\sqrt[4]{81})^3$

$3^3 = \boxed{27}$

33. $(3xy^2)^0$ $\boxed{1}$

34. $h^3 \cdot h^9 \cdot h^{-2}$ $\boxed{h^{10}}$

35. $\frac{y^4x^{-7}}{y^9x}$ $\boxed{\frac{1}{y^5x^8}}$

36. $8b^0c^{-6}d^5$ $\boxed{\frac{8d^5}{c^6}}$

37. $\frac{h^4k^0}{h^{-5}k^{-7}}$ $\boxed{h^9k^7}$

38. $\left(\frac{u^3v^{-2}}{w^3}\right)^{-5}$

$\left(\frac{w^3}{u^3v^{-2}}\right)^5 = \frac{w^{15}}{u^{15}v^{-10}} = \boxed{\frac{w^{15}v^{10}}{u^{15}}}$

39. $(7x^6y^{-12})^2$

$49x^{12}y^{-24} = \boxed{\frac{49x^{12}}{y^{24}}}$

40. $(h^{-3}k^{-2})^{-4}$ $\boxed{h^{12}k^8}$

41. $\left(\frac{2x^7y}{3y^9}\right)^3$

$\frac{8x^{21}y^3}{27y^{27}} = \boxed{\frac{8x^{21}}{27y^{24}}}$

42. $27^{-\frac{1}{3}}$

$\frac{1}{27^{1/3}} = \boxed{\frac{1}{3}}$

43. $\left(\frac{5a^3c^0}{15b^{-2}}\right)^{-2}$

$\left(\frac{15b^{-2}}{5a^3}\right)^2 = \left(\frac{3b^{-2}}{a^3}\right)^2 = \frac{9b^{-4}}{a^6} = \boxed{\frac{9}{a^6b^4}}$

44. $64^{-\frac{2}{3}}$

$\frac{1}{64^{2/3}} = \frac{1}{(\sqrt[3]{64})^2}$

$= \frac{1}{4^2} = \boxed{\frac{1}{16}}$

45. $(z^3)^{-2} \cdot (z^{-5})^2 \cdot z^9$

$z^{-6} \cdot z^{-10} \cdot z^9$

$z^{-7} = \boxed{\frac{1}{z^7}}$

Write each exponential expression in radical form.

46. $x^{\frac{5}{7}}$ $\boxed{\sqrt[7]{x^5}}$

47. $3^{\frac{1}{5}}x^{\frac{3}{5}}y^{\frac{2}{5}}$ $\boxed{\sqrt[5]{3x^3y^2}}$

48. $m^{-\frac{4}{3}}$

$\frac{1}{m^{4/3}} = \boxed{\frac{1}{\sqrt[3]{m^4}}}$

Write the radical expression in exponential form.

49. $(\sqrt[6]{a})^5$ $\boxed{a^{5/6}}$

50. $\sqrt[4]{5y^3x}$ $(5y^3x)^{1/4}$

51. $\sqrt[3]{4c^2d^7e}$ $(4c^2d^7e)^{1/3}$

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Section 6-5

Solve each equation, identify domain restrictions and check for extraneous solutions. State final answer in set notation.

52. $\frac{-3\sqrt{4x+1}}{-3} = \frac{9}{-3}$

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

$4x+1 = 9$

$4x = 8$

$x = 2$ extraneous

NO solution

53. $(\sqrt{y+3})^2 = (y-3)^2$

$y+3 = y^2 - 6y + 9$

$0 = y^2 - 7y + 6$

$0 = (y-6)(y-1)$

$y = 6$ $y \neq 1$

54. $(\sqrt{c-9})^2 = (5)^2$

$c-9 = 25$

$\boxed{c = 34}$

55. $(\sqrt[3]{d-2})^3 = (2)^3$

$d-2 = 8$

$\boxed{d = 10}$

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

$3x-1 = 2x+4$

$\boxed{x = 5}$

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

$x+4 = 3x-2$

$-2x = -6$

$\boxed{x = 3}$

58. $2\sqrt{w-7} - 7 = -3$

$\frac{2\sqrt{w-7}}{2} = \frac{4}{2}$

$(\sqrt{w-7})^2 = (2)^2$

$w-7 = 4$

$\boxed{w = 11}$

59. $\frac{5\sqrt[3]{4x+3}}{5} = \frac{15}{5}$

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

$4x+3 = 27$

$4x = 24$

$\boxed{x = 6}$

60. $(\sqrt[3]{2v+1})^3 = (2)^3$

$2v+1 = 8$

$2v = 7$

$\boxed{v = 7/2}$

61. $(\sqrt{x+6})^2 = (x+4)^2$

$x+6 = x^2 + 8x + 16$

$0 = x^2 + 7x + 10$

$0 = (x+5)(x+2)$

$x = -5$ $\boxed{x = -2}$

62. $(\sqrt{3k-11})^2 = (k-3)^2$

$3k-11 = k^2 - 6k + 9$

$0 = k^2 - 9k + 20$

$0 = (k-5)(k-4)$

$\boxed{k = 5 \quad k = 4}$

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Section 6-6

Determine the function or evaluate as requested if $f(x) = 4x - 3$, $g(x) = 5 - x$, and $h(x) = -2x^2$.

63. $f(-2)$

$4(-2)-3$

$-8-3 = -11$

64. $h(3)$

$-2(3)^2$

$-2(9) = -18$

65. $g(f(2))$

$4(2)-3 = 5$

$5-5 = 0$

66. $(f+g)(-1)$

$f(-1) = 4(-1)-3 = -7$

$g(-1) = 5-(-1) = 6$

$-7+6 = -1$

67. $(h \cdot f)(x)$

$(-2x^2)(4x-3)$

$-8x^3+6x^2$

68. $3h(x) - 2f(x)$

$3(-2x^2) - 2(4x-3)$

$-6x^2-8x+6$

69. $(h-g)(-3)$

$h(-3) = -2(-3)^2 = -2(9) = -18$

$g(-3) = 5-(-3) = 8$

$-18-8 = -26$

70. $\left(\frac{f}{g}\right)(1) =$

$f(1) = 4(1)-3 = 1$

$g(1) = 5-1 = 4$

$\frac{1}{4}$

71. $(f \circ g)(x)$ $f(g(x))$

$f(5-x)$

$4(5-x)-3$

$20-4x-3 = 17-4x$

72. $h(g(3))$

$5-3 = 2$

$h(2)$

$-2(2)^2 = -2(4) = -8$

73. $(g \circ h)(x)$

$g(h(x))$

$g(-2x^2)$

$5+2x^2$

74. $h(f(g(4)))$

$5-4 = 1$

$h(f(1))$ $4(1)-3 = 1$

$h(1) = -2(1)^2 = -2$

75. $(h \circ g)(2)$

$h(g(2))$

$5-2 = 3$

$h(3) = -2(3)^2 = -2(9) = -18$

76. $\left(\frac{h}{f}\right)(0)$

$h(0) = -2(0)^2 = 0$

$f(0) = 4(0)-3 = -3$

$0/3 = 0$

77. $(f \cdot g)(-2)$

$f(-2) = 4(-2)-3 = -11$

$g(-2) = 5-(-2) = 7$

$(-11)(7) = -77$

Section 6-7

Determine $f^{-1}(x)$, the inverse of each function.

78. $f(x) = 2x - 6$

$y = 2x-6$

$x = 2y-6$

$\frac{x+6}{2} = \frac{2y}{2}$

$y = \frac{1}{2}x+3$

$f^{-1}(x) = \frac{1}{2}x+3$

79. $f(x) = \frac{1}{3}x + 4$

$y = \frac{1}{3}x+4$

$x = \frac{1}{3}y+4$

$x-4 = \frac{1}{3}y$

$3(x-4) = y$

$y = 3x-12$

$f^{-1}(x) = 3x-12$

80. $f(x) = 3x^2 + 2$

$y = 3x^2+2$

$x = 3y^2+2$

$x-2 = 3y^2$

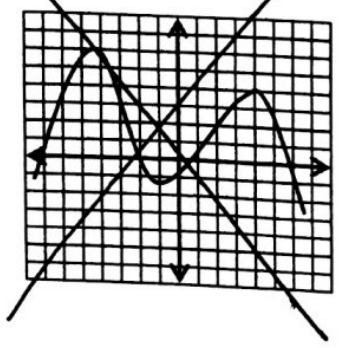
$\frac{x-2}{3} = y^2$

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

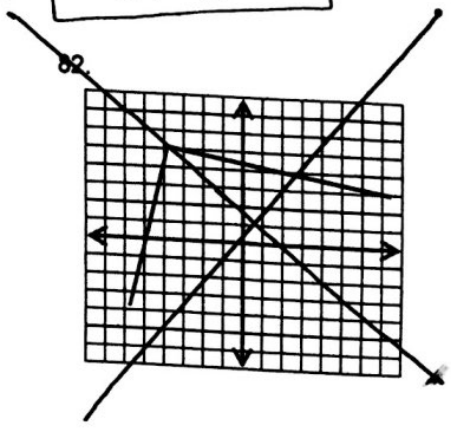
$f^{-1}(x) = \sqrt{\frac{x-2}{3}}$

Draw the inverse of each graph.

81.



82.



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