

Radicals

Write each of the following in simplified radical form.

$$1. \sqrt{20} = 2\sqrt{5}$$

$$2. \sqrt{72} = 2 \cdot 3\sqrt{2}$$

$$3. \sqrt{98} = 7\sqrt{2} \cdot 7\sqrt{2}$$

$$4. \sqrt{x^3} = x\sqrt{x}$$

$$5. \sqrt{x^5 y^2} = x^2 y \sqrt{x}$$

$$6. \sqrt{x^7 y^5 z^{11}} = x^3 y^2 z^5 \sqrt{xyz}$$

$$7. \sqrt{18x^{11}} = 3x^5 \sqrt{2x}$$

$$8. \sqrt{75y^4 z^7} = 5y^2 z^3 \sqrt{3z}$$

$$9. \sqrt{153xy^6} = 3y^3 \sqrt{17x}$$

$$10. \sqrt[3]{24} = 2\sqrt[3]{3}$$

$$11. \sqrt[3]{250} = 5\sqrt[3]{2}$$

$$12. \sqrt[3]{1080} = 2 \cdot 3\sqrt[3]{5}$$

$$13. \sqrt[3]{x^6} = x^2$$

$$14. \sqrt[3]{x^7 y^3} = x^2 y \sqrt[3]{x}$$

$$15. \sqrt[3]{x^8 y^4 z^7} = x^2 y z^2 \sqrt[3]{x^2 y z}$$

$$16. \sqrt[4]{405} = 3\sqrt[4]{5}$$

$$17. \sqrt[4]{30000} = 2 \cdot 5\sqrt[4]{3}$$

$$18. \sqrt[4]{4275} = \sqrt[4]{3^2 \cdot 5^2 \cdot 19}$$

$$19. \sqrt[4]{x^4} = x$$

$$20. \sqrt[4]{x^7 y^{12}} = xy^3 \sqrt[4]{x^3}$$

$$21. \sqrt[4]{x^6 y^{11} z^3} = xy^2 \sqrt[4]{x^2 y^3 z^3}$$

$$22. \sqrt[5]{288} = 2\sqrt[5]{3^2}$$

$$23. \sqrt[5]{1701} = 3\sqrt[5]{7}$$

$$24. \sqrt[5]{6144} = 2^2 \sqrt[5]{2 \cdot 3}$$

$$25. \sqrt[5]{x^{15}} = x^3$$

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

$$27. \sqrt[5]{x^{13} y^{10} z^7} = x^2 y^2 z^5 \sqrt[5]{x^3 z^2}$$

$$28. \sqrt[6]{192x^7} = 2x\sqrt[6]{3x}$$

$$29. \sqrt[6]{5832x^9} = 3x\sqrt[6]{2^3 x^3}$$

$$30. \sqrt[6]{x^5 y^{11} z^{15}} = yz^2 \sqrt[6]{x^5 y^5 z^3}$$

$$31. \sqrt[7]{4374x^7} = 3x\sqrt[7]{2}$$

$$32. \sqrt[7]{x^{17} y^{14}} = x^2 y^2 \sqrt[7]{x^3}$$

$$33. \sqrt[7]{x^{10} y^{22} z^{18}} = xy^3 z^2 \sqrt[7]{x^3 yz^4}$$

$$34. \sqrt[8]{64x^{12}} = x\sqrt[8]{2^6 x^4}$$

$$35. \sqrt[8]{x^{11} y^{21}} = xy^2 \sqrt[8]{x^3 y^5}$$

$$36. \sqrt[8]{x^{17} y^{20} z^{33}} = x^2 y^2 z^4 \sqrt[8]{x^1 y^4 z}$$

$$37. \frac{1}{\sqrt{5}} = \frac{\sqrt{5}}{5}$$

$$38. \frac{1}{\sqrt{x}} = \frac{\sqrt{x}}{x}$$

$$39. \frac{1}{\sqrt{3x}} = \frac{\sqrt{3x}}{3x}$$

$$40. \frac{1}{\sqrt{25x^3}} = \frac{\sqrt{x}}{5x^2}$$

$$41. \frac{1}{\sqrt{8x^5 y}} = \frac{\sqrt{2xy}}{2^2 x^3 y}$$

$$42. \frac{1}{\sqrt{32x^7 y^3}} = \frac{\sqrt{2xy}}{2^3 x^4 y^2}$$

$$43. \frac{6}{\sqrt{12x^2}} = \frac{\sqrt{3}}{x}$$

$$44. \frac{1}{\sqrt[3]{3}} = \frac{\sqrt[3]{3^2}}{3}$$

$$45. \frac{1}{\sqrt[3]{25x}} = \frac{\sqrt[3]{5x^2}}{5x}$$

46. $\frac{1}{\sqrt[3]{27x^2y}} = \frac{\sqrt[3]{xy^2}}{3xy}$

47. $\frac{1}{\sqrt[3]{4x^5y^2}} = \frac{\sqrt[3]{2xy}}{2x^2y}$

48. $\frac{1}{\sqrt[3]{50x^7y^4z^2}} = \frac{\sqrt[3]{5 \cdot 2^2 x^2 y^2 z^1}}{5 \cdot 2x^3 y^2 z}$

49. $\frac{1}{\sqrt[4]{x^3}} = \frac{\sqrt[4]{x}}{x}$

50. $\frac{1}{\sqrt[4]{6x^5}} = \frac{\sqrt[4]{2^3 \cdot 3^3 x^3}}{2 \cdot 3x^2}$

51. $\frac{1}{\sqrt[4]{25xy^5}} = \frac{\sqrt[4]{5^2 x^3 y^3}}{5xy^2}$

52. $\frac{1}{\sqrt[4]{7x^2y^6z^{11}}} = \frac{\sqrt[4]{7^3 x^2 y^2 z}}{7xy^2z^3}$

53. $\frac{1}{\sqrt[5]{x^3}} = \frac{\sqrt[5]{x^2}}{x}$

54. $\frac{1}{\sqrt[5]{8x^4}} = \frac{\sqrt[5]{2^2 x}}{2x}$

55. $\frac{1}{\sqrt[5]{x^7y^2}} = \frac{\sqrt[5]{x^3y^3}}{x^2y}$

56. $\frac{1}{\sqrt[5]{x^{17}y^{11}}} = \frac{\sqrt[5]{x^3y^4}}{x^4y^3}$

57. $\frac{1}{\sqrt[5]{x^{13}y^{18}z^{20}}} = \frac{\sqrt[5]{x^2y^2}}{x^3y^4z^4}$

58. $\frac{1}{\sqrt[6]{32x^2}} = \frac{\sqrt[6]{2x^4}}{2x}$

59. $\frac{1}{\sqrt[6]{x^4y^7}} = \frac{\sqrt[6]{x^2y^5}}{xy^2}$

60. $\frac{1}{\sqrt[6]{x^{14}y^{10}}} = \frac{\sqrt[6]{x^4y^2}}{x^3y^2}$

61. $\frac{1}{\sqrt[6]{x^{12}y^5z^{17}}} = \frac{\sqrt[6]{yz}}{x^2yz^3}$

62. $\frac{1}{\sqrt[7]{x^2y^{11}}} = \frac{\sqrt[7]{x^5y^3}}{xy^2}$

63. $\frac{1}{\sqrt[8]{x^6y^{11}z^{12}}} = \frac{\sqrt[8]{x^2y^5z^4}}{xy^2z^2}$

64. $(x^3y^5)^{1/2} = xy^2\sqrt{xy}$

65. $(x^7y^{11}z)^{1/2} = x^3y^5\sqrt{xyz}$

66. $(x^4y^7)^{1/3} = xy^2\sqrt[3]{xy}$

67. $(x^{11}y^9z^5)^{1/3} = x^3y^3z\sqrt[3]{x^2z^2}$

68. $(x^6y^4)^{1/4} = xy^4\sqrt{x^2}$

69. $(x^{12}y^7z^9)^{1/4} = x^3yz^2\sqrt[4]{y^3z}$

70. $(x^{13}y^6)^{1/5} = x^2y\sqrt[5]{x^3y}$

71. $(x^{16}y^{24}z^{11})^{1/5} = x^3y^4z^2\sqrt[5]{xy^4z}$

72. $(x^{11}y^4z^9)^{1/6} = xz\sqrt[6]{x^5y^4z^3}$

73. $\frac{1}{(x^3y^2)^{1/2}} = \frac{\sqrt{x}}{x^2y}$

74. $\frac{1}{(x^7y^5z)^{1/2}} = \frac{\sqrt{xyz}}{x^4y^3z}$

75. $\frac{1}{(x^3y^5)^{1/3}} = \frac{\sqrt[3]{y}}{xy^2}$

76. $\frac{1}{(x^7y^6)^{1/3}} = \frac{\sqrt[3]{x^2}}{x^3y^2}$

77. $\frac{1}{(x^3y^2z)^{1/4}} = \frac{\sqrt[4]{xy^2z^3}}{xyz}$

78. $\frac{1}{(x^7y^3z^6)^{1/4}} = \frac{\sqrt[4]{xyz^2}}{x^2yz^2}$

79. $\frac{1}{(x^2y^3z^4)^{1/5}} = \frac{\sqrt[5]{x^3y^2z}}{xyz}$

80. $\frac{1}{(x^7y^6z^8)^{1/5}} = \frac{\sqrt[5]{x^3y^4z^2}}{x^2y^2z^2}$

81. $\frac{1}{(x^{17}y^9z^{12})^{1/5}} = \frac{\sqrt[5]{x^3yz^3}}{x^4y^2z^3}$

82. $\frac{1}{(x^7y^3z^6)^{1/6}} = \frac{\sqrt[6]{x^5y^3}}{x^2yz}$

83. $\frac{1}{(x^{11}y^2z^3)^{1/6}} = \frac{\sqrt[6]{xy^4z^3}}{x^2yz}$

84. $\frac{1}{(x^5y^{13}z^{16})^{1/7}} = \frac{\sqrt[7]{x^2yz^5}}{xy^2z^3}$