

Simplify each radical expression.

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

$5x^3$

125  
25 5  
5 5

2.  $\sqrt[3]{81x^4y^{20}}$

$3xy^5$

81  
9 9  
3 3 3

3.  $\sqrt[3]{-8x^6y^4z^8}$

$-2x^2yz^2\sqrt[3]{yz^2}$

$\sqrt[3]{-8} \sqrt[3]{x^6} \sqrt[3]{y^3} \sqrt[3]{z^6} / \sqrt[3]{y} \sqrt[3]{z^2}$

4.  $\sqrt{48x^5y^8z^3}$

$4x^2y^4z\sqrt{3xz}$

48  
16 3  
4 4 2  
2 2

5.  $3\sqrt{x^4y} \cdot 7\sqrt{x^2y^3}$

$21x^3y^2$

21  $\sqrt{x^6y^4}$

6.  $2\sqrt{4x^3y^2} \cdot \sqrt[3]{2y}$

$4xy$

$2\sqrt[3]{8x^3y^3}$

7.  $7\sqrt{4xy^4z^9} \cdot \sqrt{27x^6z^2}$

$42x^3y^2z^5\sqrt{3xz}$

7  $\sqrt{108x^7y^4z^{11}}$   
7  $\sqrt{36x^6y^4z^{10}} / \sqrt{3xz}$

8.  $\frac{\sqrt{162x^3}}{\sqrt{6x}}$

$3x\sqrt{3}$

$\sqrt{27x^2}$   
 $\sqrt{9x^2} / \sqrt{3}$

9.  $\frac{\sqrt{24x^4y^8}}{\sqrt{2x^2y}}$

$2xy^3\sqrt{3y}$

$\sqrt{12x^2y^7}$   
 $\sqrt{4x^2y^6} / \sqrt{3y}$

10.  $\frac{\sqrt[3]{250x^7y^3}}{\sqrt[3]{2x^2y}}$

$5x\sqrt[3]{x^2y^2}$

125  
25 5  
5 5

$\sqrt[3]{125x^5y^2}$   
 $\sqrt[3]{125} \sqrt[3]{x^3} / \sqrt[3]{x^2} \sqrt[3]{y^2}$

11.  $3\sqrt{7} + 2\sqrt{7}$

$5\sqrt{7}$

12.  $\sqrt{5} - \sqrt{10}$

can't be combined

13.  $3\sqrt{32} + 2\sqrt{50}$

$22\sqrt{2}$

$\sqrt{16}\sqrt{2} \quad \sqrt{25}\sqrt{2}$   
 $12\sqrt{2} + 10\sqrt{2}$

14.  $\sqrt{200} - \sqrt{72}$

$4\sqrt{2}$

$\sqrt{100}\sqrt{2} \quad \sqrt{36}\sqrt{2}$   
 $10\sqrt{2} - 6\sqrt{2}$

15.  $\sqrt[3]{81} - \sqrt[3]{24} + \sqrt[3]{125}$

$\sqrt[3]{3} + 5$

$\sqrt[3]{27} \sqrt[3]{3} \quad \sqrt[3]{8} \sqrt[3]{3}$   
 $3\sqrt[3]{3} - 2\sqrt[3]{3} + 5$

16.  $5\sqrt{x} + 9\sqrt{x}$

$14\sqrt{x}$

17.  $3\sqrt{x^3} - 7x\sqrt{x}$

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

$-4x\sqrt{x}$

18.  $\sqrt{5}(6\sqrt{2} + \sqrt{8})$



$6\sqrt{10} + \sqrt{40}$   
 $\sqrt{4}\sqrt{10}$

$6\sqrt{10} + 2\sqrt{10}$

$8\sqrt{10}$

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

$\frac{10 + 2\sqrt{3}}{25 + 5\sqrt{3} - 5\sqrt{3} - \sqrt{9}} =$

$\frac{10 + 2\sqrt{3}}{25 - 3} = \frac{10 + 2\sqrt{3}}{22}$

20.  $\frac{(3 - 4\sqrt{5})(1 - \sqrt{5})}{(1 + \sqrt{5})(1 - \sqrt{5})}$

$\frac{3 - 3\sqrt{5} - 4\sqrt{5} + 4\sqrt{25}}{1 - \sqrt{5} + \sqrt{5} - \sqrt{25}}$

$\frac{5 + \sqrt{3}}{11}$

$\frac{3 - 7\sqrt{5} + 20}{1 - 5} =$

$\frac{23 - 7\sqrt{5}}{-4}$

23.  $(64y^4)^{\frac{1}{2}}$

your  $\sqrt{64}$

$8y^2$

21.  $\frac{(2 - 4\sqrt{2})(1 + \sqrt{2})}{(1 - \sqrt{2})(1 + \sqrt{2})}$

$\frac{2 + 2\sqrt{2} - 4\sqrt{2} - 4\sqrt{4}}{1 + \sqrt{2} - \sqrt{2} - \sqrt{4}}$

$\frac{2 - 2\sqrt{2} - 8}{1 - 2} =$

$\frac{-6 - 2\sqrt{2}}{-1} = 6 + 2\sqrt{2}$

22.  $2^{\frac{1}{4}} \cdot 8^{\frac{1}{4}}$

$4\sqrt{2} \cdot 4\sqrt{8}$

$4\sqrt{16} = 2$

24.  $(-27x^9)^{\frac{1}{3}}$

your  $\sqrt[3]{-27}$

$-3x^3$

25.  $(36x^2y^4)^{-\frac{1}{2}}$

$\left(\frac{1}{36x^2y^4}\right)^{\frac{1}{2}}$

$\frac{1}{6xy^2}$

your  $\sqrt{36}$

26.  $(4x^6y^{10})^{\frac{1}{2}}$

$2x^3y^5$

your  $\sqrt{4}$

27.  $\frac{(125x^{12}y^9)^{\frac{1}{3}}}{y^9}$

$\left(\frac{y^9}{125x^{12}}\right)^{\frac{1}{3}}$

$\frac{y^3}{5x^4}$

your  $\sqrt[3]{125}$