

Simplifying Radicals

Simplify each of the following:

$$1. \sqrt{3^2} = 3$$

$$2. \sqrt{5^4} = 5^2$$

$$3. \sqrt{7^2} = 7$$

$$4. \sqrt{x^6} = x^3$$

$$5. \sqrt{y^{12}} = y^6$$

$$6. \sqrt{3^5} = 3^2\sqrt{3}$$

$$7. \sqrt{7^9} = 7^4\sqrt{7}$$

$$8. \sqrt{13^3} = 13\sqrt{13}$$

$$9. \sqrt{17^9} = 17^8\sqrt{17}$$

$$10. \sqrt{2^3 \cdot 3^4} = 2 \cdot 3^2\sqrt{2}$$

$$11. \sqrt{3^5 \cdot 7^2 \cdot 13} = 3^2 \cdot 7\sqrt{3 \cdot 13}$$

$$12. \sqrt{5^4 \cdot 7 \cdot 17} = 5^2\sqrt{7 \cdot 17}$$

$$13. \sqrt{x^3} = x\sqrt{x}$$

$$14. \sqrt{y^6} = y^3$$

$$15. \sqrt{z^{11}} = z^5\sqrt{z}$$

$$16. \sqrt{x^2 y^6} = xy^3$$

$$17. \sqrt{x^4 y^9} = x^2 y^4 \sqrt{y}$$

$$18. \sqrt{x^6 y^8} = x^3 y^4$$

$$19. \sqrt{x^5 y^7 z^4} = x^2 y^3 z^2 \sqrt{xy}$$

$$20. \sqrt{2^4 \cdot 5^3 \cdot x^2 y^5} = 2^2 \cdot 5 \cdot xy^2 \sqrt{5y}$$

$$21. \sqrt{7^3 \cdot 19^2 \cdot x^8 \cdot y^4 \cdot z^5} = 7 \cdot 9 \cdot x^4 y^2 z^2 \sqrt{7z}$$

$$22. \sqrt{(x+1)^2} = (x+1)$$

$$23. \sqrt{(x+5)^2} = (x+5)$$

$$24. \sqrt{(x-3)^2} = (x-3)$$

$$25. \sqrt{(x-4)^4} = (x-4)^2$$

$$26. \sqrt{(3x-7)^2} = (3x-7)$$

$$27. \sqrt{(x^2+5x-3)^2} = (x^2+5x-3)$$

$$28. \sqrt{\frac{5^6}{5^4}} = \sqrt{5^2} = 5$$

$$29. \sqrt{\frac{2^7}{2^4}} = \sqrt{2^3} = 2\sqrt{2}$$

$$30. \sqrt{\frac{x^8}{x^4}} = \sqrt{x^4} = x^2$$

$$31. \sqrt{\frac{x^4 y^9}{x^2 y^7}} = \sqrt{x^2 y^2} = xy$$

$$32. \sqrt{\frac{x^2 y^7 z^{11}}{x^2 y^3 z^5}} = \sqrt{y^4 z^6} = y^2 z^3$$

$$33. \sqrt{\frac{3^5 x^9 y^{15}}{3x^7 y^{12}}} = \sqrt{3^4 x^2 y^3} = 3^2 xy\sqrt{y}$$

Extension:

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

$$2. \sqrt[4]{x^6 y^8} = xy^2\sqrt[4]{x^2}$$

$$3. \sqrt[3]{5^5 x^4 y^9} = 5xy^3\sqrt[3]{5^2 x}$$

$$4. \sqrt[5]{x^{11} y^{17}} = x^2 y^3 \sqrt[5]{xy^2}$$

$$5. \sqrt[4]{5^7 x^3 y^6} = 5y\sqrt[4]{5^3 x^3 y^2}$$

$$6. \sqrt[4]{2^9 \cdot 3^{11} \cdot x^{14} y^{10}} = 2^2 \cdot 3^2 \cdot x^3 y^2 \sqrt[4]{2 \cdot 3^3 \cdot x^2 y^2}$$