

4.3 Operations with Radical Expressions Name _____

Simplify the expressions.

1. $\sqrt{10} \cdot \sqrt{5}$

2. $\sqrt{35} \cdot \sqrt{5}$

3. $\sqrt[3]{2} \cdot \sqrt[3]{28}$

4. $\sqrt[3]{4} \cdot \sqrt[3]{26}$

5. $\sqrt{5x^3} \cdot \sqrt{40x}$

6. $\sqrt{15x} \cdot \sqrt{3x^5}$

7. $\sqrt{2x^3y^3} \cdot \sqrt{54x^2y}$

8. $\sqrt{30x^5y^3} \cdot \sqrt{5x^3y^4}$

Answers: 1. $5\sqrt{2}$; 3. $2\sqrt[3]{7}$; 5. $10x^2\sqrt{2}$; 7. $6x^2y^2\sqrt{3x}$

Simplify the expressions.

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

10. $\frac{\sqrt{50}}{\sqrt{2}}$

11. $\frac{\sqrt{3x^9}}{\sqrt{27x}}$

12. $\frac{\sqrt{2x}}{\sqrt{32x^5}}$

13. $\frac{\sqrt[3]{16x^{14}}}{\sqrt[3]{2x^7}}$

14. $\frac{\sqrt[3]{54x^{25}}}{\sqrt[3]{2x^4}}$

15. $\frac{\sqrt{200x^8y^5z}}{\sqrt{10x^{10}y^2z}}$

16. $\frac{\sqrt{300x^6y^7z^3}}{\sqrt{20x^4y^2z}}$

Answers: 9. 3; 11. $\frac{x^4}{3}$; 13. $2x^2\sqrt[3]{x}$; 15. $\frac{2y\sqrt{5y}}{x}$

Simplify the expressions.

17. $4\sqrt{3} - 2\sqrt{3}$

18. $5\sqrt{7} - \sqrt{7}$

19. $4\sqrt{x} + 2 + 6\sqrt{x} - \sqrt{x}$

20. $2\sqrt{y} + 5y - 4\sqrt{y} - 2\sqrt{y}$

21. $\sqrt{20} + \sqrt{45}$

22. $\sqrt{75} + \sqrt{108}$

23. $8\sqrt{45} + 7\sqrt{20} + 2\sqrt{5}$

24. $5\sqrt{12} - 2\sqrt{27} - 3\sqrt{3}$

Answers: 17. $2\sqrt{3}$; 19. $9\sqrt{x} + 2$; 21. $5\sqrt{5}$; 23. $40\sqrt{5}$

Simplify the expressions.

25. $\sqrt{5}(x + \sqrt{5})$

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

27. $(2 - 2\sqrt{2})(1 + \sqrt{3})$

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

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

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

31. $(2 + \sqrt{3})^2$

32. $(1 + \sqrt{2})^2$

Answers: 25. $x\sqrt{5} + 5$; 27. $2 + 2\sqrt{3} - 2\sqrt{2} - 2\sqrt{6}$; 29. 1; 31. $7 + 4\sqrt{3}$

Rationalize the denominators

33. $\frac{4}{\sqrt{5}}$

34. $\frac{3}{\sqrt{2}}$

35. $\frac{5}{\sqrt[3]{4}}$

36. $\frac{1}{\sqrt[3]{9}}$

37. $\frac{2}{5-\sqrt{3}}$

38. $\frac{4}{1-\sqrt{2}}$

39. $\frac{\sqrt{x}}{10+\sqrt{x}}$

40. $\frac{\sqrt{2}}{4-\sqrt{2}}$

Answers: 33. $\frac{4\sqrt{5}}{5}$; 35. $\frac{5\sqrt[3]{2}}{2}$; 37. $\frac{5+\sqrt{3}}{11}$; 38. $\frac{10\sqrt{x-x}}{100-x}$