Use the product rule to multiply:

1. $\sqrt[7]{8\,x^3y^2} \cdot \sqrt[7]{3\,x^4y^4}$

2. $\sqrt[7]{7\,x^2y^3} \cdot \sqrt[7]{6}$

3. $\sqrt[5]{4\,y^4} \cdot \sqrt[5]{3\,y^2}$

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

5. $\sqrt[7]{3} \cdot \sqrt[7]{5\,x^3y^3}$

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

7. $\sqrt{4\,x^3} \cdot \sqrt{1}$

8. $\sqrt[4]{8} \cdot \sqrt[4]{4\,x^4y^5}$

9. $\sqrt[6]{7\,x^2} \cdot \sqrt[6]{3\,y^4}$

10. $\sqrt{8} \cdot \sqrt{2\,y^5}$

Simplify by factoring:

11. $\sqrt[3]{40\,x}$

12. $\sqrt[3]{189\,x}$

13. $\sqrt[3]{320}$

14. $\sqrt{48}$

15. $\sqrt[3]{320}$

16. $\sqrt[3]{192}$

17. $\sqrt{48\,x}$

18. $\sqrt{112}$

19. $\sqrt[3]{40\,x}$

20. $\sqrt[3]{40}$

21. $\sqrt[4]{80\,x^{10}y^{18}}$

22. $\sqrt[3]{40\,x^{15}y^3}$

23. $\sqrt{28\,y^6}$

24. $\sqrt[4]{567\,y^6}$

25. $\sqrt[4]{112}$

26. $\sqrt[4]{32\,y^{10}}$

27. $\sqrt[3]{8\,x^8}$

28. $\sqrt{12}$

29. $\sqrt{9\,x^3}$

30. $\sqrt[4]{48}$

Multiply and simplify:

31. $\sqrt{40\,x} \cdot \sqrt{5\,x}$

32. $\sqrt{49\,x} \cdot \sqrt{7\,x}$

33. $\sqrt{20} \cdot \sqrt{5}$

34. $\sqrt{18} \cdot \sqrt{3}$

35. $\sqrt{15} \cdot \sqrt{5}$

36. $\sqrt{9} \cdot \sqrt{3}$

37. $\sqrt{12\,x} \cdot \sqrt{3\,x}$

38. $\sqrt{56} \cdot \sqrt{7}$

39. $\sqrt{35\,x} \cdot \sqrt{5\,x}$

40. $\sqrt{40} \cdot \sqrt{5}$

41. $\sqrt[4]{x^2y^3z^2} \cdot \sqrt[4]{x^7y^4z^4}$

42. $\sqrt[3]{x} \cdot \sqrt[3]{x^7}$

43. $\sqrt[4]{xy} \cdot \sqrt[4]{x^5y^4}$

44. $\sqrt[3]{x^3yz^4} \cdot \sqrt[3]{x^3y^3z^3}$

45. $\sqrt[3]{xy} \cdot \sqrt[3]{x^7y^3}$

46. $\sqrt[5]{x^2y^2} \cdot \sqrt[5]{x^5y^5}$

47. $\sqrt[5]{x} \cdot \sqrt[5]{x^2}$

48. $\sqrt[4]{xyz^4} \cdot \sqrt[4]{x^4y^4z^5}$

49. $\sqrt[5]{x^3y^2} \cdot \sqrt[5]{x^6y^5}$

50. $\sqrt{x^3y^3z^2} \cdot \sqrt{x^2y^2z^5}$

Solutions: (Please note that if a radical bar is not *directly* over a variable, then that variable is considered to be outside of the radical.)

1. $\sqrt[7]{24\,x^7y^6}$

2. $\sqrt[7]{42\,x^2y^3}$

3. $\sqrt[5]{12\,y^6}$

4. $\sqrt[3]{18\,x^3y^7}$

5. $\sqrt[7]{15\,x^3y^3}$

6. $\sqrt[5]{6\,x^5y^9}$

7. $\sqrt{4\,x^3}$

8. $\sqrt[4]{32\,x^4y^5}$

9. $\sqrt[6]{21\,x^2y^4}$

10. $\sqrt{16\,y^5}$

11. $2\sqrt[3]{5\,x}$

12. $3\sqrt[3]{7\,x}$

13. $4\sqrt[3]{5}$

14. $4\sqrt{3}$

15. $4\sqrt[3]{5}$

16. $4\sqrt[3]{3}$

17. $4\sqrt{3\,x}$

18. $4\sqrt{7}$

19. $2\sqrt[3]{5\,x}$

20. $2\sqrt[3]{5}$

21. $2\,x^2y^4\sqrt[4]{5\,x^2y^2}$

22. $2\,x^5y\sqrt[3]{5}$

23. $2\,y^3\sqrt{7}$

24. $3\,y\sqrt[4]{7\,y^2}$

25. $2\sqrt[4]{7}$

26. $2\,y^2\sqrt[4]{2\,y^2}$

27. $2\,x^2\sqrt[3]{x^2}$

28. $2\sqrt{3}$

29. $3\,x\sqrt{x}$

30. $2\sqrt[4]{3}$

31. $10\sqrt{2}x$

32. $7\sqrt{7}x$

33. 10

34. $3\sqrt{6}$

35. $5\sqrt{3}$

36. $3\sqrt{3}$

37. $6\,x$

38. $14\sqrt{2}$

39. $5\sqrt{7}x$

40. $10\sqrt{2}$

41. $x^2yz\sqrt[4]{xy^3z^2}$

42. $x^2\sqrt[3]{x^2}$

43. $xy\sqrt[4]{x^2y}$

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

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

46. $xy\sqrt[5]{x^2y^2}$

47. $1\sqrt[5]{x^3}$

48. $xyz^2\sqrt[4]{xyz}$

49. $xy\sqrt[5]{x^4y^2}$

50. $x^2y^2z^3\sqrt{xyz}$