

EXERCISES

Simplify each radical in simplest radical form

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|----------------------------|------------------------------|----------------------------|----------------------------|
| 1. $\sqrt{12}$ | 2. $\sqrt{18}$ | 3. $-\sqrt{24}$ | 4. $\pm\sqrt{27}$ |
| 5. $\sqrt{32}$ | 6. $\sqrt{28}$ | 7. $\sqrt{80}$ | 8. $\sqrt{48}$ |
| 9. $\sqrt{150}$ | 10. $\pm\sqrt{108}$ | 11. $\sqrt{120}$ | 12. $-\sqrt{162}$ |
| 13. $\sqrt{396}$ | 14. $\sqrt{1800}$ | 15. $\sqrt{3200}$ | 16. $\sqrt{1875}$ |
| 17. $5\sqrt{72}$ | 18. $-4\sqrt{44}$ | 19. $\pm 7\sqrt{125}$ | 20. $10\sqrt{363}$ |
| 21. $3\sqrt{264}$ | 22. $9\sqrt{648}$ | 23. $8\sqrt{1200}$ | 24. $12\sqrt{1875}$ |
| 25. $-\sqrt[3]{54}$ | 26. $\sqrt[3]{-54}$ | 27. $\pm\sqrt[3]{-16}$ | 28. $\sqrt[3]{81}$ |
| 29. $\sqrt[3]{-81}$ | 30. $\sqrt[4]{81}$ | 31. $\sqrt[4]{(-3)^4}$ | 32. $\sqrt[5]{(-3)^5}$ |
| 33. $\sqrt{\frac{16}{4}}$ | 34. $\pm\sqrt{\frac{8}{49}}$ | 35. $\frac{3}{\sqrt{6}}$ | 36. $-6\sqrt{\frac{5}{6}}$ |
| 37. $\sqrt{\frac{18}{24}}$ | 38. $\sqrt{\frac{121}{8}}$ | 39. $3\sqrt{\frac{24}{9}}$ | 40. $\sqrt{3\frac{2}{5}}$ |

Simplify each radical in simplest radical form. Assume that all variables are nonnegative real numbers and that all denominators are nonzero.

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|------------------------------|----------------------------------|-------------------------------------|----------------------------|
| 41. $\sqrt{4a^2}$ | 42. $\sqrt{100x^4}$ | 43. $\pm\sqrt{28a^4}$ | 44. $\sqrt{x^2 - 8x + 16}$ |
| 45. $\sqrt{a^2 + 2ab + b^2}$ | 46. $-\sqrt{32b^2}$ | 47. $\sqrt{18a^3}$ | 48. $\sqrt{24x^5}$ |
| 49. $\sqrt{24a^2b^4}$ | 50. $\sqrt{\frac{x^4y^5}{4z^2}}$ | 51. $\pm\sqrt{\frac{8a^3b^2}{c^4}}$ | 52. $\sqrt{80m^7n^5}$ |
| 53. $\sqrt[3]{a^6b^5}$ | 54. $\sqrt[4]{a^{12}b^8}$ | 55. $\sqrt[3]{-27x^3}$ | 56. $\sqrt[5]{-32x^5}$ |

Simplify each radical in simplest radical form.

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|------------------------------|----------------------------------|-------------------------------------|----------------------------|
| 57. $\sqrt{4a^2}$ | 58. $\sqrt{100x^4}$ | 59. $\pm\sqrt{28a^4}$ | 60. $\sqrt{x^2 - 8x + 16}$ |
| 61. $\sqrt{a^2 + 2ab + b^2}$ | 62. $-\sqrt{32b^2}$ | 63. $\sqrt{18a^3}$ | 64. $\sqrt{24x^5}$ |
| 65. $\sqrt{24a^2b^4}$ | 66. $\sqrt{\frac{x^4y^5}{4z^2}}$ | 67. $\pm\sqrt{\frac{8a^3b^2}{c^4}}$ | 68. $\sqrt{80m^7n^5}$ |
| 69. $\sqrt[3]{a^6b^5}$ | 70. $\sqrt[4]{a^{12}b^8}$ | 71. $\sqrt[3]{-27x^3}$ | 72. $\sqrt[5]{-32x^5}$ |
| 73. $\sqrt[4]{4}$ | 74. $\sqrt[6]{216}$ | 75. $\sqrt[4]{x^6}$ | 76. $\sqrt[4]{u^6v^8}$ |

EXERCISES

Simplify each radical expression in simplest radical form.

1. $5\sqrt{3} + 2\sqrt{3}$

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

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

4. $2\sqrt{6} - \sqrt{6} + 7\sqrt{6}$

5. $9\sqrt{5} + 12\sqrt{5} - 4\sqrt{5}$

6. $-\sqrt{18} - \sqrt{8}$

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

8. $\sqrt[3]{4} + \sqrt[3]{32}$

9. $5\sqrt{32} - 7\sqrt{50}$

10. $\sqrt{150} + 2\sqrt{96}$

11. $3\sqrt{28} - 2\sqrt{7} + \sqrt{63}$

12. $\sqrt{11} + \sqrt{44} - \sqrt{13}$

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

14. $\sqrt[3]{9} \cdot \sqrt[3]{6}$

15. $2\sqrt{5} \cdot 4\sqrt{8}$

16. $6\sqrt{2} \cdot 3\sqrt{18}$

17. $\sqrt{2} \cdot \sqrt{3} \cdot \sqrt{12}$

18. $\sqrt{6} \cdot \sqrt{6} \cdot \sqrt{24}$

19. $(4\sqrt{5})^2$

20. $(4\sqrt[3]{5})^3$

21. $\sqrt{5}(\sqrt{5} - \sqrt{3})$

22. $3\sqrt{2}(2\sqrt{3} + \sqrt{2})$

23. $(3 + \sqrt{2})(5 - \sqrt{2})$

24. $(6 - \sqrt{5})(7 - 2\sqrt{5})$

25. $(\sqrt{5} + \sqrt{4})^2$

26. $(\sqrt{5} - \sqrt{4})^2$

27. $(\sqrt{5} + \sqrt{4})(\sqrt{5} - \sqrt{4})$

28. $\sqrt{\frac{3}{2}} - \sqrt{\frac{2}{3}}$

29. $\sqrt{\frac{7}{11}} + \sqrt{\frac{11}{7}}$

30. $\sqrt{\frac{4}{5}} - \sqrt{\frac{2}{10}}$

31. $\sqrt{\frac{2}{5}} + \sqrt{10}$

32. $3\sqrt{6} - \sqrt{\frac{2}{3}}$

33. $\sqrt{\frac{8}{3}} \cdot \sqrt{\frac{5}{4}}$

34. $\sqrt{\frac{5}{4}} \cdot \sqrt{\frac{4}{5}}$

35. $\frac{\sqrt{15}}{\sqrt{10}}$

36. $\frac{\sqrt[3]{15}}{\sqrt[3]{10}}$

Simplify each radical expression in simplest radical form. Assume that all variables are nonnegative real numbers and that all denominators are nonzero.

37. $\sqrt{x} + \sqrt{x}$

38. $\sqrt{3x} + \sqrt{3x}$

39. $3\sqrt{x} + 4\sqrt{x}$

40. $5\sqrt{2x} - 2\sqrt{2x}$

41. $7\sqrt{5x} - 11\sqrt{5x}$

42. $\sqrt{3x} - \sqrt{75x}$

43. $3\sqrt{20x} + 4\sqrt{45x}$

44. $7x\sqrt{x} - 5x\sqrt{x}$

45. $\sqrt{2x^2} + 3\sqrt{8x^2}$

46. $2\sqrt{18x^3} - \sqrt{8x^3}$

47. $\sqrt{\frac{x^2}{4} + \frac{x^2}{16}}$

48. $\sqrt{\frac{a}{x}} - \sqrt{\frac{x}{a}}$

49. $\sqrt{3m} \cdot \sqrt{8m}$

50. $\sqrt{xy^3} \cdot \sqrt{xy^5}$

51. $(10\sqrt{ab^2})(-2\sqrt{a^3})$

52. $\sqrt{2a}(\sqrt{8a} - \sqrt{18a^3})$

53. $\sqrt{6x}(\sqrt{4x} + 2\sqrt{2x^2})$

54. $(3\sqrt{4x})^2$

55. $(4\sqrt{3x})^3$

56. $\sqrt[3]{56x} + \sqrt[3]{7x}$

57. $x^4\sqrt{x^{11}} - \sqrt[4]{x^{15}}$

58. $\frac{\sqrt{x^2y}}{\sqrt{2xy}}$

59. $\frac{\sqrt{2ab}}{\sqrt{6b}}$

60. $\frac{\sqrt[3]{2ab}}{\sqrt[3]{6b}}$