Chapter 9 Review Exercises

Fill in each blank with a word that correctly completes the sentence.

1. The number within a radical is called the _____ . **(9.1)**

2. Like radicals have the same _____ . **(9.2)**

3. The _____ of the radical expression $(2 + \sqrt{5})$ is $(2 - \sqrt{5})$. **(9.3)**

4. Multiplying a fraction by a form of 1 to change the denominator into an integer is called

    _____ .the denominator. **(9.4)**

Section 9.1

Simplify the following square roots, if possible. If the radicand has no perfect square factor, then write "cannot be simplified."

5. $\sqrt{75}$	**6.** $\sqrt{44}$	**7.** $\sqrt{500}$
8. $5\sqrt{18}$	**9.** $-3\sqrt{32}$	**10.** $\frac{-3}{2}\sqrt{24}$

Use the Product Rule of Radicals to write each as one radical. Simplify, if possible.

11. $\sqrt{15} \cdot \sqrt{2}$	**12.** $\sqrt{18} \cdot \sqrt{2}$	**13.** $\sqrt{5} \cdot \sqrt{8}$
14. $\left(\sqrt{7}\right)^2$	**15.** $\sqrt{6} \cdot \sqrt{12}$	**16.** $\sqrt{15} \cdot \sqrt{20}$

Use the Quotient Rules of Radicals to simplify the expression completely.

17. $\dfrac{\sqrt{32}}{\sqrt{2}}$	**18.** $\sqrt{\dfrac{25}{36}}$	**19.** $\sqrt{\dfrac{49}{121}}$
20. $\sqrt{\dfrac{15}{4}}$	**21.** $\sqrt{\dfrac{50}{81}}$	**22.** $\sqrt{\dfrac{27}{100}}$

Section 9.2

Simplify each expression.

23. $4\sqrt{7} + 6\sqrt{7}$

24. $4\sqrt{5} - 10\sqrt{5}$

25. $-\sqrt{6} + 3\sqrt{6}$

26. $-2\sqrt{3} - 9\sqrt{3}$

27. $\sqrt{40} - \sqrt{90}$

28. $-\sqrt{50} - \sqrt{18}$

29. $5\sqrt{6} + 3\sqrt{24}$

30. $-3\sqrt{20} + 2\sqrt{45}$

Simplify each expression.

31. $\dfrac{9 + 6\sqrt{5}}{3}$

32. $\dfrac{4 - 9\sqrt{2}}{6}$

33. $\dfrac{-8 - \sqrt{44}}{2}$

34. $\dfrac{15 - \sqrt{50}}{10}$

Section 9.3

Multiply and simplify, if possible.

35. $3\left(6\sqrt{5} + 8\sqrt{3}\right)$

36. $\sqrt{10}\left(\sqrt{2} - \sqrt{6}\right)$

37. $\left(3 - \sqrt{6}\right)\left(8 + \sqrt{6}\right)$

38. $\left(1 + \sqrt{2}\right)\left(3 - \sqrt{6}\right)$

39. $\left(\sqrt{2} + 8\right)\left(10 - \sqrt{2}\right)$

40. $\left(\sqrt{3} - \sqrt{2}\right)\left(3 - 2\sqrt{6}\right)$

41. $\left(\sqrt{5} + 2\sqrt{2}\right)\left(4\sqrt{5} - 6\sqrt{2}\right)$

42. $\left(5 + \sqrt{2}\right)^2$

43. $\left(\sqrt{6} + \sqrt{3}\right)^2$

44. $\left(4 - \sqrt{7}\right)\left(4 + \sqrt{7}\right)$

Section 9.4

Rationalize the denominator.

45. $\dfrac{\sqrt{10}}{\sqrt{3}}$

46. $\dfrac{9}{\sqrt{6}}$

47. $\dfrac{5}{\sqrt{2}}$

48. $\dfrac{20}{\sqrt{10}}$

49. $\dfrac{6\sqrt{2}}{\sqrt{5}}$

50. $\dfrac{\sqrt{20}}{\sqrt{2}}$

Rationalize the denominator.

51. $\dfrac{6}{5 + \sqrt{2}}$

52. $\dfrac{9}{\sqrt{5} - \sqrt{2}}$

53. $\dfrac{12}{3 + 2\sqrt{2}}$

54. $\dfrac{-5}{1 + \sqrt{2}}$

55. $\dfrac{2 + \sqrt{6}}{\sqrt{3} - \sqrt{2}}$

56. $\dfrac{1 + \sqrt{6}}{\sqrt{3} + \sqrt{2}}$