Algebra I

Name Key

Period _____ Date _____

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Chapter11 Review

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Simplify each expression

1. $\sqrt{18}$

$= \sqrt{9 \cdot 2}$

$= \sqrt{9} \cdot \sqrt{2}$

$= 3\sqrt{2}$

2. $\sqrt{80}$

$= \sqrt{16 \cdot 5}$

$= \sqrt{16} \cdot \sqrt{5}$

$= 4\sqrt{5}$

3. $\sqrt{40a^4}$

$= \sqrt{4 \cdot 10 \cdot a^2 \cdot a^2}$

$= 2a^2\sqrt{10}$

4. $7\sqrt{30} \cdot 2\sqrt{6}$

$= 7 \cdot 2 \cdot \sqrt{30} \cdot \sqrt{6}$

$= 14\sqrt{30 \cdot 6}$

$= 14\sqrt{180} = 14\sqrt{36 \cdot 5}$

$= 14 \cdot 6\sqrt{5} = 84\sqrt{5}$

5. $\sqrt{147x^6y^7}$

$= \sqrt{49 \cdot 3 \cdot x^2 \cdot x^2 \cdot x^2 \cdot y^2 \cdot y^2 \cdot y^2 \cdot y}$

$= 7|x^3|y^3\sqrt{3y}$

6. $\sqrt{72x^3y^4z^5}$

$= \sqrt{36 \cdot 2 \cdot x^2 \cdot x \cdot y^2 \cdot y^2 \cdot z^2 \cdot z^2 \cdot z}$

$= 6|x|y^2z^2\sqrt{2xz}$

7. $\sqrt{\frac{2}{7}} \cdot \sqrt{\frac{7}{3}}$

$= \frac{\sqrt{2}}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{3}} = \frac{\sqrt{14}}{\sqrt{21}}$

$= \frac{\sqrt{14}}{\sqrt{21}} \cdot \frac{\sqrt{21}}{\sqrt{21}} = \frac{\sqrt{294}}{21} = \frac{7\sqrt{6}}{21}$

$= \frac{\sqrt{6}}{3}$

8. $\sqrt{\frac{t}{8}} = \frac{\sqrt{t}}{\sqrt{8}} = \frac{\sqrt{t}}{2\sqrt{2}}$

$= \frac{\sqrt{t}}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2t}}{2 \cdot 2}$

$= \frac{\sqrt{2t}}{4}$

9. $\sqrt{50m^3n^5}$

$= \sqrt{25 \cdot 2 \cdot m^2 \cdot m \cdot n^2 \cdot n^2 \cdot n}$

$= 5mn^2\sqrt{2 \cdot mn}$

10. $\frac{\sqrt{9x^5y}}{\sqrt{12x^2y}}$

$= \frac{\sqrt{9} \cdot \sqrt{x^2} \cdot \sqrt{x^2} \cdot \sqrt{x} \cdot \sqrt{y}}{\sqrt{4} \cdot \sqrt{3} \cdot \sqrt{x^2} \cdot \sqrt{y}}$

$\frac{3x\sqrt{x}}{2\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{3x\sqrt{3x}}{2 \cdot 3}$

$= \frac{x\sqrt{3x}}{2}$

11. $\sqrt{\frac{5c^5}{4d^3}}$

$= \frac{c^2\sqrt{5c}}{2d^2\sqrt{d}} \cdot \frac{\sqrt{d}}{\sqrt{d}}$

$= \frac{c^2\sqrt{5cd}}{2|d^3|}$

12. $\sqrt{\frac{27}{p^2}} = \frac{\sqrt{3^2 \cdot 3}}{\sqrt{p^2}}$

$= \frac{3\sqrt{3}}{p}$

13. $\sqrt{5} \cdot \sqrt{6}$

$= \sqrt{30}$

14. $\sqrt{3} \cdot \sqrt{8}$

$= \sqrt{24} = 2\sqrt{6}$

15. $\frac{\sqrt{50}}{\sqrt{8}}$

$= \frac{5\sqrt{2}}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$= \frac{5 \cdot 2}{2 \cdot 2} = \frac{5}{2} = 2.5$

Simplify each expression.

16. $8\sqrt{3} - 2\sqrt{2} + 3\sqrt{2} + 5\sqrt{3}$

$= (8+5)\sqrt{3} + (-2+3)\sqrt{2}$

$= 13\sqrt{3} + \sqrt{2}$

17. $16\sqrt{x} + 2\sqrt{x}$

$= (16+2)\sqrt{x}$

$= 18\sqrt{x}$

18. $8\sqrt{2y} - 7\sqrt{y} + 4\sqrt{2y}$

$= (8+4)\sqrt{2y} - 7\sqrt{y}$

$= 12\sqrt{2y} - 7\sqrt{y}$

19. $\dfrac{18}{6-\sqrt{2}}$

$= \dfrac{18}{6-\sqrt{2}} \cdot \dfrac{6+\sqrt{2}}{6+\sqrt{2}} = \dfrac{108+18\sqrt{2}}{36-2}$

$= \dfrac{108+18\sqrt{2}}{34} = \dfrac{54+9\sqrt{2}}{17}$

20. $\dfrac{10}{\sqrt{7}+\sqrt{2}}$

$= \dfrac{10}{\sqrt{7}+\sqrt{2}} \cdot \dfrac{\sqrt{7}-\sqrt{2}}{\sqrt{7}-\sqrt{2}}$

$= \dfrac{10\sqrt{7}-10\sqrt{2}}{7-2}$

$= \dfrac{10\sqrt{7}-10\sqrt{2}}{5} = 2\sqrt{7}-2\sqrt{2}$

21. $\dfrac{2\sqrt{7}}{-6+\sqrt{8}} \cdot \dfrac{-6-\sqrt{8}}{-6-\sqrt{8}}$

$= \dfrac{-12\sqrt{7} - 2\sqrt{56}}{36-8}$

$= \dfrac{-12\sqrt{7} - 4\sqrt{14}}{28}$

$= \dfrac{-3\sqrt{7} - \sqrt{14}}{7}$

22. $2\sqrt{3} + 9\sqrt{12}$

$= 2\sqrt{3} + 18\sqrt{3}$

$= 20\sqrt{3}$

23. $\sqrt{6} + 2\sqrt{3} + \sqrt{12}$

$\sqrt{6} + 2\sqrt{3} + 2\sqrt{3}$

$\sqrt{6} + 4\sqrt{3}$

24. $2\sqrt{50} - 3\sqrt{32}$

$10\sqrt{2} - 12\sqrt{2}$

$= -2\sqrt{2}$

25. $\sqrt{2} + \sqrt{\dfrac{1}{2}}$

$= \sqrt{2} + \left[\dfrac{\sqrt{1}}{\sqrt{2}} \cdot \dfrac{\sqrt{2}}{\sqrt{2}}\right]$

$= \sqrt{2} + \dfrac{\sqrt{2}}{2} = \dfrac{2\sqrt{2}}{2} + \dfrac{\sqrt{2}}{2} = \dfrac{3\sqrt{2}}{2}$

26. $\sqrt{10} - \sqrt{\dfrac{2}{5}}$

$\sqrt{10} - \left[\dfrac{\sqrt{2}}{\sqrt{5}} \cdot \dfrac{\sqrt{5}}{\sqrt{5}}\right] = \sqrt{10} - \dfrac{\sqrt{10}}{5}$

$\dfrac{5\sqrt{10}}{5} - \dfrac{\sqrt{10}}{5} = \dfrac{4\sqrt{10}}{5}$

27. $\sqrt{6}(\sqrt{3} + 5\sqrt{2})$

$= \sqrt{18} + 5\sqrt{12}$

$= 3\sqrt{2} + 10\sqrt{3}$

28. $3\sqrt{3} - \sqrt{45} + 3\sqrt{\dfrac{1}{3}}$

$= 3\sqrt{3} - 3\sqrt{5} + 3\left[\dfrac{\sqrt{1}}{\sqrt{3}} \cdot \dfrac{\sqrt{3}}{\sqrt{3}}\right]$

$= 3\sqrt{3} - 3\sqrt{5} + 3 \cdot \dfrac{\sqrt{3}}{3}$

$4\sqrt{3} - 3\sqrt{5}$

29. $6\sqrt{\dfrac{7}{4}} + 3\sqrt{28} - 10\sqrt{\dfrac{1}{7}}$

$6 \cdot \left[\dfrac{\sqrt{7}}{\sqrt{4}} \cdot \dfrac{\sqrt{4}}{\sqrt{4}}\right] + 6\sqrt{7} - 10 \cdot \left[\dfrac{\sqrt{1}}{\sqrt{7}} \cdot \dfrac{\sqrt{7}}{\sqrt{7}}\right]$

$\dfrac{6\sqrt{28}}{4} + 6\sqrt{7} - \dfrac{10\sqrt{7}}{7} =$

$= \underbrace{3\sqrt{7} + 6\sqrt{7}}_{9\sqrt{7}} - \dfrac{10\sqrt{7}}{7} = \dfrac{63\sqrt{7}}{7} - \dfrac{10\sqrt{7}}{7} = \dfrac{53\sqrt{7}}{7}$

Simplify each expression.

30. $(7 - \sqrt{10})^2$

$= 49 - 14\sqrt{10} + 10$

$= 59 - 14\sqrt{10}$

31. $(3 + \sqrt{5})(3 - \sqrt{5})$

$9 - 5 = 4$

$= 4$

32. $\sqrt{5}(2\sqrt{10} + 3\sqrt{2})$

$2\sqrt{50} + 3\sqrt{10}$

$= 10\sqrt{2} + 3\sqrt{10}$

33. $(\sqrt{6} + \sqrt{8})(\sqrt{24} + \sqrt{2})$

$\sqrt{144} + \sqrt{12} + \sqrt{192} + \sqrt{16}$

$12 + 2\sqrt{3} + 8\sqrt{3} + 4$

$= 16 + 10\sqrt{3}$

34. $(\sqrt{6} - 3)^2$

$= 6 - 6\sqrt{6} + 9$

$15 - 6\sqrt{6}$

35. $\sqrt{18} + 5\sqrt{2} - 3\sqrt{32}$

$3\sqrt{2} + 5\sqrt{2} - 12\sqrt{2}$

$(3 + 5 - 12)\sqrt{2}$

$= -4\sqrt{2}$

Solve each equation.

36. $3\sqrt{4a} - 2 = 10$

$+2 \quad +2$

$3 \cdot 2\sqrt{a} = 12$

$\frac{6\sqrt{a}}{6} = \frac{12}{6}$

$\sqrt{a} = 2$

$a = 4$

37. $\sqrt{4b + 1} - 3 = 0$

$+3 \quad +3$

$(\sqrt{4b+1})^2 = (3)^2$

$4b + 1 = 9$

$-1 \quad -1$

$\frac{4b}{4} = \frac{8}{4}$

$b = 2$

38. $\sqrt{3r - 5} + 7 = 3$

$-7 \quad -7$

$(\sqrt{3r-5})^2 = (-4)^2$

$3r - 5 = 16$

$+5 \quad +5$

$3r = 21$

$r = 7$

no solution

39. $x = \sqrt{6 - x}$

$(x)^2 = (\sqrt{6-x})^2$

$x^2 = 6 - x$

$x^2 + x - 6 = 0$

$(x + 3)(x - 2) = 0$

$x = \{-3, 2\}$

40. $(\sqrt{5x - 6})^2 = (x)^2$

$5x - 6 = x^2$

$x^2 - 5x + 6 = 0$

$(x - 3)(x - 2) = 0$

$x = \{2, 3\}$

41. $\sqrt{3d - 8} = d - 2$

$(\sqrt{3d-8})^2 = (d-2)^2$

$3d - 8 = d^2 - 4d + 4$

$-3d \quad +8 \quad -3d \quad +8$

$d^2 - 7d + 12 = 0$

$(d - 3)(d - 4) = 0$

$d = \{3, 4\}$

42. $5\sqrt{\frac{4t}{3}} - 2 = 0$

$5\sqrt{\frac{4t}{3}} = 2$

$(5\sqrt{\frac{4t}{3}})^2 = 2^2$

$25(\frac{4t}{3}) = 4$

$\frac{100t}{3} = 4(3)$

$\frac{100t}{100} = \frac{12}{100}$

$t = \frac{3}{25}$

$\frac{4t}{3} = \frac{4}{25}$

$t = \frac{3}{25}$

43. $\sqrt{\frac{4x}{5}} - 9 = 3$

$(\sqrt{\frac{4x}{5}})^2 = 12^2$

$5(\frac{4x}{5}) = (144)5$

$4x = 720$

$x = 180$