Algebra 2
6.1 6.6 Review

Name: Key
Period: _____

Simplify the following. Assume all variables are positive (aka don't worry about absolute value).

1. $\sqrt{16x^4}$ $6x^2$

2. $\sqrt{c^{80}d^{50}}$ $c^{40}d^{25}$

3. $\sqrt[4]{81x^{12}}$ $3x^3$

4. $\sqrt[5]{-32k^5}$ $-2k$

Multiply or divide, then simplify.

5. $\sqrt{3x^4}\cdot\sqrt{24x^3}$ $\sqrt{3\cdot2\cdot2\cdot3}x^7 = 6x^3\sqrt{2x}$

6. $\sqrt[3]{4}\cdot\sqrt[3]{18}$ $\sqrt[3]{2\cdot2\cdot3\cdot3\cdot2}$ $2\sqrt[3]{9}$

7. $\sqrt{5a^3}\cdot\sqrt{20a}$ $\sqrt{5\cdot5\cdot2\cdot2a^4}$ $10a^2$

8. $\frac{\sqrt{80}}{\sqrt{5}}$ $\sqrt{16}$ 4

9. $\frac{\sqrt{18x^5y}}{\sqrt{2x}}$ $\sqrt{9x^4y}$ $3x^2\sqrt{y}$

10. $\frac{\sqrt[3]{640w^3z^8}}{\sqrt[3]{5wz^4}}$ $\sqrt[3]{128w^2z^4}$ $\sqrt[3]{2\cdot64w^2z^4} = 4z\sqrt[3]{2w^2z}$

Simplify.

11. $2\sqrt{7}+3\sqrt{7}$ $5\sqrt{7}$

12. $\sqrt{32}+\sqrt{8}$ $4\sqrt{2}+2\sqrt{2}$ $6\sqrt{2}$

13. $\sqrt{7x}+\sqrt{28x}$ $\sqrt{7x}+2\sqrt{7x}$ $3\sqrt{7x}$

14. $8\sqrt{45}-3\sqrt{80}$ $24\sqrt{5}-12\sqrt{5}$ $12\sqrt{5}$

15. $(2+\sqrt{5})(3+\sqrt{5})$ $6+2\sqrt{5}+3\sqrt{5}+5$ $11+5\sqrt{5}$

16. $(\sqrt{10}+3)^2$ $(\sqrt{10}+3)(\sqrt{10}+3)$ $10+3\sqrt{10}+3\sqrt{10}+9$ $19+6\sqrt{10}$

17. $(3\sqrt{5}-2)(3\sqrt{5}+2)$ $3(5)-4$ $15-4=11$

18. $\frac{5}{(2-\sqrt{3})}\frac{(2+\sqrt{3})}{(2+\sqrt{3})}$ $\frac{10+5\sqrt{3}}{2-3} = \frac{10+5\sqrt{3}}{-1} = -10-5\sqrt{3}$

19. $\frac{4-3\sqrt{7}}{(1+2\sqrt{7})}\frac{(1-2\sqrt{7})}{(1-2\sqrt{7})} = \frac{4-8\sqrt{7}-3\sqrt{7}+6}{1-4(7)}$ $\frac{46-11\sqrt{7}}{-27}$

Write each expression in simplest form. Leave no negative exponents. Assume all variables are positive.

20. $81^{\frac{1}{2}}$ 9

21. $36^{\frac{1}{4}}\cdot36^{\frac{1}{4}}$ $36^{\frac{1}{2}}=6$

22. $\left(x^{\frac{4}{3}}y^{\frac{3}{5}}\right)^{15}$ $x^{20}y^9$

23. $\left(x^{\frac{1}{4}}y^{-\frac{3}{8}}\right)^{16}$ x^4y^{-6} $\frac{x^4}{y^6}$

24. $(8x^{15}y-9)^{-\frac{1}{3}}$ $\frac{1}{\sqrt[3]{8x^{15}y^{-9}}} = \frac{1}{2x^5y^{-3}}$ $\frac{y^3}{2x^5}$

25. $(-27x^{-9}y^6)^{\frac{1}{3}}$ $-3x^{-3}y^2$ $\frac{-3y^2}{x^3}$

26. $(32x^{20}y^{-10})^{-\frac{1}{5}}$ $\frac{1}{\sqrt[5]{32x^{20}y^{-10}}}$ $\frac{1}{2x^4y^{-2}} = \frac{y^2}{2x^4}$

27. $\left(\frac{81y^{16}}{16x^{12}}\right)^{\frac{1}{4}}$ $\frac{3y^4}{2x^3}$

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28. $\sqrt{5} \cdot \sqrt[3]{5}$ $5^{\frac{1}{2}} \cdot 5^{\frac{1}{3}} = 5^{5/6} = \sqrt[6]{5^5}$

29. $\frac{\sqrt[6]{x^2}}{\sqrt[3]{x^5}} = \frac{x^{2/6}}{x^{5/3}}$ $\frac{2}{6} - \frac{5}{3} = \frac{2}{6} - \frac{10}{6} = \frac{-8}{6}$

$\frac{1}{x^{8/6}} = \frac{1}{\sqrt[6]{x^8}}$

Solve. Check for extraneous solutions.

30. $\sqrt{13x-10} = 3x$ **CHECK:**

$13x - 10 = 9x^2$

$9x^2 - 13x + 10 = 0$

31. $\sqrt{x+20} = x$ **CHECK:**

$x + 20 = x^2$

$x^2 - x - 20 = 0$

$(x-5)(x+4) = 0$

$x = 5, x = -4$

32. $(4x-12)^{\frac{1}{2}} + 3 = x$ **CHECK:**

$[(4x-12)^{1/2}]^2 = (x-3)^2$

$4x - 12 = x^2 - 6x + 9$

$0 = x^2 - 10x + 21$

$0 = (x-7)(x-3)$

✓ $x = 7, x = 3$

Let f (x) = 3x² and g(x) = 2 – 5x. Perform each function operation.

33. $f(x) - g(x)$

$3x^2 - (2-5x)$

$3x^2 + 5x - 2$

34. $f(x) \cdot g(x)$

$(3x^2)(2-5x)$

$6x^2 - 15x^3$

$2 - 5x = 0$

$2 = 5x$

35. $\frac{f(x)}{g(x)}$ $\frac{3x^2}{2-5x}$

$D: \{x : x \in \mathbb{R}, x \neq \frac{2}{5}\}$

36. $(f+g)(x)$

$3x^2 - 5x + 2$

37. $(f \cdot g)(x)$

$6x^2 - 15x^3$

38. $\frac{g}{f}(x)$ $\frac{2-5x}{3x^2}$

$D: \{x : x \in \mathbb{R}, x \neq 0\}$

Let $f(x) = x^2$ and $g(x) = 3x + 1$. Evaluate each expression.

39. $(f \circ g)(0)$ $f(g(0))$

$f(3(0)+1)$

$f(1) = 1^2 = 1$

40. $(f \circ g)(2)$ $f(g(2))$

$f(6+1)$

$f(7) = 7^2 = 49$

41. $(f \circ g)(23)$ $f(g(23))$

$f(70)$

4900

42. $(f \circ g)(5)$

$f(g(5))$

$f(15+1) = f(16) = 256$

43. $(g \circ f)(0)$ $g(f(0))$

$g(0)$

$3(0) + 1 = 1$

44. $(g \circ f)(1)$

$g(f(1))$

$g(1) = 3(1) + 1$

$= 4$

45. $(g \circ f)(-1)$ $g(f(-1))$

$g(1)$

4

46. $(f \circ f)(3)$

$f(f(3))$

$f(9)$

81

47. $(g \circ g)(4)$

$g(g(4))$

$g(13) = 39 + 1 = 40$