

Name Key

O = good for groups on the board

Date _____

Show all work for credit. There will be a quiz over this material. Answers are attached.

1. Simplify: $\frac{\sqrt{48}}{\sqrt{3}}$

$$\frac{\sqrt{16}\sqrt{3}}{\sqrt{3}} = \boxed{4}$$

2. Simplify: $\frac{\sqrt{75}}{\sqrt{3}}$

$$\frac{\sqrt{25}\sqrt{3}}{\sqrt{3}} = \boxed{5}$$

3. Simplify: $6\sqrt{3} \times 4\sqrt{6}$

$$\frac{24\sqrt{18}}{24\sqrt{9}\sqrt{2}} = \boxed{72\sqrt{2}}$$

4. Simplify: $10\sqrt{2} \times 3\sqrt{10}$

$$\frac{30\sqrt{20}}{30\sqrt{4}\sqrt{5}} = \boxed{60\sqrt{5}}$$

5. Simplify completely:

$$\frac{2\sqrt{3}(3\sqrt{6} - 3\sqrt{3})}{6\sqrt{18} - 6\sqrt{9}} = \frac{6\sqrt{9}\sqrt{2} - 6\sqrt{9}}{18\sqrt{2} - 18} = \boxed{\frac{\sqrt{2} - 1}{\sqrt{2} - 1}}$$

6. Simplify: $4\sqrt{12} + 3\sqrt{48}$

$$4\sqrt{12} + 3\sqrt{12}\sqrt{4} = 4\sqrt{12} + 6\sqrt{12} = 10\sqrt{12}$$

$$\frac{10\sqrt{4}\sqrt{3}}{20\sqrt{3}} = \boxed{5}$$

7. Convert to radical form:

$$64^{\frac{1}{3}} = \boxed{3\sqrt[3]{64}}$$

8. Write in simple radical form:

$$\frac{1}{\sqrt{7}} = \boxed{\frac{\sqrt{7}}{7}}$$

9. Rationalize the denominator:

$$\frac{10}{2\sqrt{5}} = \frac{10\sqrt{5}}{10} = \boxed{\sqrt{5}}$$

10. Rationalize the denominator:

$$\frac{12}{4\sqrt{3}} = \frac{12\sqrt{3}}{12} = \boxed{\sqrt{3}}$$

11. Simplify: $\frac{2}{1-\sqrt{3}}$

$$\frac{2(1+\sqrt{3})}{(1-\sqrt{3})(1+\sqrt{3})} = \frac{2+2\sqrt{3}}{1-3} = \boxed{-1-\sqrt{3}}$$

12. Rationalize the denominator:

$$\frac{8}{\sqrt{6}-2} \cdot \frac{(\sqrt{6}+2)}{(\sqrt{6}+2)} = \frac{8\sqrt{6}+16}{6-4} = \boxed{4\sqrt{6}+8}$$

Simplify.

13. $\sqrt{200w^5z^{12}}$

$$\frac{\sqrt{100}\sqrt{2}\sqrt{w^4}\sqrt{w}\sqrt{z^8}\sqrt{z^4}}{10w^2z^6\sqrt{zw}} = \boxed{10\sqrt{2}w^2z^6\sqrt{zw}}$$

14. $\sqrt[3]{27}$

$$\boxed{3}$$

15. $\sqrt[3]{64}$

$$\boxed{4}$$

16. $-\sqrt[4]{625}$

$$\boxed{-5}$$

$$\sqrt{200} \cdot \sqrt{w^5} \sqrt{z^{12}}$$

17. $\pm\sqrt[4]{\frac{625}{16}}$

$$\boxed{\pm\frac{5}{2}}$$

18. $\sqrt[3]{-56}$

$$\frac{-3\sqrt[3]{8} \cdot 3\sqrt[3]{7}}{-2 \cdot 3\sqrt[3]{7}} = \boxed{-2\sqrt[3]{7}}$$

19. $\sqrt[3]{-250}$

$$\frac{-\sqrt[3]{125} \sqrt[3]{2}}{\sqrt[3]{5^3 \sqrt{2}}}$$

20. $-\sqrt[3]{72a^3b^4}$

$$\frac{-\sqrt[3]{8} \sqrt[3]{9} \sqrt[3]{a^3} \sqrt[3]{b^3} \sqrt[3]{b}}{-2^3 \sqrt[3]{9ab^3} \sqrt{b}} = \boxed{-2ab^3 \sqrt[3]{9b}}$$

$$-\sqrt[3]{72} \sqrt[3]{a^3} \sqrt[3]{b^4}$$

$$-\sqrt[3]{8} \sqrt[3]{9} a \sqrt[3]{b^3} \sqrt[3]{b}$$

$$-2^3 \sqrt[3]{9} a b^3 \sqrt[3]{b}$$

$$-2ab^3 \sqrt[3]{9b}$$

Rewrite using exponents.

21. $\sqrt{5}$

$$\boxed{5^{1/2}}$$

22. $\sqrt[5]{15}$

$$\boxed{15^{1/5}}$$

23. $\sqrt[3]{14^3}$

$$\boxed{14^{3/3}}$$

$$\sqrt[3]{a^3} = a^{3/3} = a^1 = a$$

24. $\sqrt[4]{9m^5}$

$$\boxed{9^{1/4} m^{5/4}}$$

Rewrite without any exponents.

25. $5^{5/2}$

$$\begin{aligned} & \sqrt[2]{5^5} \quad (5^{1/2})^5 \\ & \sqrt[2]{5^2} \sqrt[2]{5^2} \sqrt[2]{5} \quad (5^{-1/2})^{1/2} \\ & \sqrt[2]{25} \sqrt[2]{5} \quad \sqrt{3125} \end{aligned}$$

26. $27^{1/3}$

$$\begin{aligned} & \sqrt[3]{27} \\ & \sqrt[3]{9 \sqrt{3}} \\ & \sqrt[3]{3 \sqrt{3}} \end{aligned}$$

Simplify.

27. (No calc) $27^{1/3}$

$$\begin{aligned} & \sqrt[3]{27} \\ & \boxed{3} \end{aligned}$$

28. (No calc) $9^{5/2}$

$$\begin{aligned} & \frac{81}{243} \sqrt[2]{9^5} \sqrt[2]{9^2} \sqrt[2]{9} \\ & \frac{81}{243} \cdot 9 \cdot 9 \sqrt{9} \\ & \boxed{243} \quad 81 \sqrt{9} \end{aligned}$$

29. (No calc) $25^{3/2}$

$$\begin{aligned} & \sqrt[2]{25^3} \quad \frac{25}{25} \\ & \sqrt[2]{25^2} \sqrt[2]{25} \quad \frac{25}{25} \\ & 25 \cdot 5 \quad \boxed{125} \end{aligned}$$

30. (No calc) $9^{3/2}$

$$\begin{aligned} & \sqrt[2]{9^3} \\ & \sqrt[2]{9^2} \sqrt[2]{9} \\ & 9 \sqrt{9} \quad \boxed{27} \end{aligned}$$

31. (No calc) $16^{3/4}$

$$\frac{\sqrt[4]{16^3} \sqrt[4]{16}}{\sqrt[4]{16}} = \frac{16}{2} = \boxed{8}$$

32. (No calc) $(\frac{-8}{27})^{2/3}$

$$\left[\left(\frac{-8}{27} \right)^{1/3} \right]^2 = \left(\frac{-2}{3} \right)^2 = \frac{4}{9}$$

33. Simplify: $\frac{16x^{-16}}{-4x^4}$

$$\frac{-4}{x^{20}} \text{ or } \boxed{-4x^{-20}}$$

34. Simplify: $\frac{-24x^{-24}y^{-12}}{4x^{-6}y^{-3}}$

$$\frac{-6x^6y^3}{x^{18}y^9} = \boxed{\frac{-6}{x^{12}y^6}}$$

35. Simplify: $\left(\frac{6x^3y}{2xy^4} \right)^2$

$$\frac{36x^6y^2}{4x^2y^8} = \boxed{\frac{9x^4}{y^6}}$$

36. Simplify: $\frac{-16x^{-16}}{-4x^{-4}}$

$$\frac{4}{x^{12}}$$

37. Simplify: $(2x^4y^5)^3$

$$8x^{12}y^{15}$$

38. Simplify and rewrite using only positive exponents:

$$\left(\frac{x^2}{y^3}\right)^{-2} \frac{y^6}{x^4}$$

Simplify.

39. 4^{-2}

$$\frac{1}{16}$$

40. $\left(-\frac{4}{5}\right)^0$

$$1$$

41. $35 \cdot 21^{-1}$

$$\frac{35}{21} = \frac{5}{3}$$

42. $3^3 \cdot 6^{-2}$

$$\frac{27}{36} = \frac{3}{4}$$

43. $64^{\frac{3}{2}}$

$$(64^{\frac{1}{2}})^3 = 4^3 = 64$$

44. $b^{-\frac{5}{3}} \cdot b^{\frac{8}{3}}$

$$b^{-\frac{25}{15}} b^{\frac{16}{15}} = b^{-\frac{9}{15}}$$

45. $\left(\frac{1}{16}\right)^{-\frac{5}{4}}$

$$16^{\frac{5}{4}} = 2^5 = 32$$

46. $\left(-\frac{27}{64}\right)^{-\frac{1}{3}}$

$$\frac{-64}{27} = -\frac{4}{3}$$

47. $\left(\frac{25}{9}\right)^{-\frac{3}{2}}$

$$\left(\frac{9}{25}\right)^{\frac{3}{2}} = \left(\frac{3}{5}\right)^3 = \frac{27}{125}$$

48. $\sqrt{54} + (-\sqrt{24})$

$$\sqrt{9 \cdot 6} - \sqrt{4 \cdot 6} = 3\sqrt{6} - 2\sqrt{6} = \sqrt{6}$$

49. $3\sqrt{24} - 5\sqrt{3} + \sqrt{54}$

$$3 \cdot \sqrt{4 \cdot 6} - 5\sqrt{3} + \sqrt{9 \cdot 6} = 6\sqrt{6} - 5\sqrt{3} + 3\sqrt{6} = 9\sqrt{6} - 5\sqrt{3}$$

50. $\frac{-15r^0}{30p^{-2}}$

$$\frac{-15}{30} p^2 = -\frac{1}{2} p^2$$

51. $\frac{10ab^{-7}c^{-2}}{15a^{-2}b^0c^{-3}}$

$$\frac{10a^2a^2c^3}{15b^7} = \frac{2a^4c^3}{3b^7}$$

52. $\frac{(a^5)(a^2)}{(a^5)^2}$

$$\frac{a^7a^2}{a^{10}} = \frac{a^9}{a^{10}} = \frac{1}{a}$$

53. $\frac{(6cd^2)^2}{24c^5d^4}$

$$\frac{36c^2d^4}{24c^5d^4} = \frac{3}{2c^3}$$

54. Simplify: $\sqrt[3]{\sqrt{64}}$

$$\begin{aligned} & (64^{\frac{1}{2}})^{\frac{1}{3}} \\ & (64^{\frac{1}{3}})^{\frac{1}{2}} \\ & (4)^{\frac{1}{4}} \\ & (2^2)^{\frac{1}{4}} \\ & (2)^{\frac{2}{4}} \\ & (2)^{\frac{1}{2}} \\ & \sqrt{2} \end{aligned}$$

Exponent review 8/24/2006

Answer List

- | | | |
|-----------------------------|---|--------------------------------------|
| 1. 4 | 2. 5 | 3. $72\sqrt{2}$ |
| 4. $60\sqrt{5}$ | 5. $18\sqrt{2} - 18$ | 6. $20\sqrt{3}$ |
| 7. $\sqrt[3]{64^4}$ | 8. $\frac{\sqrt{7}}{7}$ | 9. $\sqrt{5}$ |
| 10. $\sqrt{3}$ | 11. $-1 - \sqrt{3}$ | 12. $4\sqrt{6} + 8$ |
| 13. $10w^2z^6\sqrt{2w}$ | 14. 3 | 15. 4 |
| 16. -5 | 17. $\pm\frac{5}{2}$ | 18. $-2\sqrt[3]{7}$ |
| 19. $-5\sqrt[3]{2}$ | 20. $-2ab\sqrt[3]{9b}$ | 21. $5\frac{1}{2}$ |
| 22. $15\frac{1}{5}$ | 23. $14\frac{3}{5}$ | 24. $9\frac{1}{4}m\frac{5}{4}$ |
| 25. $25\sqrt{5}$ | 26. $3\sqrt{3}$ | 27. 3 |
| 28. 243 | 29. 125 | 30. 27 |
| 31. 8 | 32. $\frac{4}{9} \sqrt[3]{\frac{3}{2}}$ | 33. $-4x^{-20}$ |
| 34. $-6x^{-18}y^{-9}$ | 35. $\frac{9x^4}{y^6}$ | 36. $4x^{-12}$ |
| 37. $8x^{12}y^{15}$ | 38. $\frac{y^6}{x^4}$ | 39. $\frac{1}{16}$ |
| 40. 1 | 41. $\frac{5}{3}$ | 42. $\frac{3}{4}$ |
| 43. 16 | 44. $b^{-\frac{7}{15}}$ | 45. 32 |
| 46. $-\frac{4}{3}$ | 47. $\frac{27}{125}$ | 48. $\sqrt{6}$ |
| 49. $9\sqrt{6} - 5\sqrt{3}$ | 50. $-\frac{p^2}{2}$ | 51. $\frac{2a^3c}{3b^7}$ |
| 52. $\frac{1}{a^3}$ | 53. $\frac{3}{2c^3}$ | 54. $\sqrt{2}$ |

(1-22)

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