Rational Exponents WS 4 Name answer key

Simplify.

1. $\sqrt[3]{-27a^3b^{12}} = -3ab^4$

2. $\sqrt[3]{32} = \sqrt[3]{2^5} = 2\sqrt[3]{4}$

3. $\frac{2}{\sqrt{8}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{2}}{\sqrt{16}} = \frac{2\sqrt{2}}{4} = \frac{\sqrt{2}}{2}$

4. $\sqrt[3]{\frac{9}{m^2}} \cdot \frac{\sqrt[3]{m}}{\sqrt[3]{m}} = \frac{\sqrt[3]{9m}}{m}$

5. $\frac{4}{(\sqrt{5}-1)} \cdot \frac{(\sqrt{5}+1)}{(\sqrt{5}+1)} = \frac{4\sqrt{5}+4}{4} = \sqrt{5}+1$

6. $\sqrt[4]{4a^2b^3} \cdot \sqrt[4]{4a^3b^4} = \sqrt[4]{16a^5b^7} = 2ab\sqrt[4]{ab^3}$

7. $16^{\frac{3}{4}} = 2^3 = 8$

8. $\sqrt[4]{\frac{8}{9a^3}} \cdot \frac{\sqrt[4]{9a}}{\sqrt[4]{9a}} = \frac{\sqrt[4]{72a}}{3a}$

9. $7\sqrt{2}+4\sqrt{12}-\sqrt{50}$
$7\sqrt{2}+8\sqrt{3}-5\sqrt{2} = 2\sqrt{2}+8\sqrt{3}$

10. $(3\sqrt{2}-\sqrt{3})(3\sqrt{2}+\sqrt{3})$
$18-3 = 15$

11. $\frac{2}{(\sqrt{3}+\sqrt{6})} \cdot \frac{(\sqrt{3}-\sqrt{6})}{(\sqrt{3}-\sqrt{6})} = \frac{2\sqrt{3}-2\sqrt{6}}{-3}$

12. $\sqrt[3]{\frac{2}{3}} \cdot \frac{\sqrt[3]{3^2}}{\sqrt[3]{3^2}} = \frac{\sqrt[3]{18}}{3}$

13. $\left(\frac{1}{27}\right)^{\frac{-2}{3}} = 27^{\frac{2}{3}} = 3^2 = 9$

14. $\sqrt{2} \cdot \sqrt[3]{2} = 2^{\frac{1}{2}} \cdot 2^{\frac{1}{3}} = 2^{5/6} = \sqrt[6]{32}$

15. $\frac{9}{3^{\frac{2}{3}}} = \frac{9}{\sqrt[3]{3^2}} \cdot \frac{\sqrt[3]{3}}{\sqrt[3]{3}} = \frac{9\sqrt[3]{3}}{3} = 3\sqrt[3]{3}$

16. $\sqrt[6]{81} = \sqrt[6]{3^4} = 3^{\frac{2}{3}} = \sqrt[3]{9}$

17. $\left(x^{\frac{2}{3}}\right)^{\frac{3}{4}} = x^{\frac{1}{2}} = \sqrt{x}$

18. $\frac{x^{\frac{2}{3}}y}{x^{-2}y^{\frac{3}{4}}} = \frac{x^{2/3} \cdot x^2 \cdot y}{y^{3/4}} = x^{8/3}y^{1/4}$

19. $(-8)^{-\frac{2}{3}} = \left(-\frac{1}{8}\right)^{2/3} = \left(-\frac{1}{2}\right)^2 = 1/4$

20. $\left(3^{\frac{1}{2}} \cdot 5^{\frac{2}{3}}\right)^{\frac{3}{2}} = 3^{3/4} \cdot 5 = 5\sqrt[4]{27}$

21. $\left(2^{\frac{1}{3}} \cdot 2^{\frac{3}{4}}\right)^{\frac{1}{2}} = \left(2^{\frac{13}{12}}\right)^{\frac{1}{2}} = 2^{\frac{13}{24}} = \sqrt[24]{2^{13}}$

22. $\left(\left(5^{\frac{2}{3}}\right)^{\frac{1}{5}}\right)^2 = 5^{4/15} = \sqrt[15]{625}$

23. $\left(\frac{6^{1/2}}{6^{1/3}}\right)^{3/5} = \left(6^{1/6}\right)^{3/5} = 6^{1/10} = \sqrt[10]{6}$

24. $\left(\frac{3^{1/2}}{12^{1/2}}\right)^3 = \left(\left(\frac{1}{4}\right)^{\frac{1}{2}}\right)^3 = \left(\frac{1}{4}\right)^{3/2} = \left(\frac{1}{2}\right)^3 = \frac{1}{8}$

25. $\sqrt[4]{\sqrt[3]{\sqrt{4}}} = \left(\left(2\right)^{\frac{1}{2}}\right)^{\frac{1}{3}\cdot\frac{1}{4}} = 2^{\frac{1}{12}} = \sqrt[12]{2}$

26. $\sqrt{\frac{\sqrt{108}}{\sqrt{27}}} = \sqrt{\sqrt{4}} = \sqrt{2}$

27. $\frac{x^{5/4}y^{2/3}}{xy} = \frac{x^{1/4}}{y^{1/3}}$

28. $\sqrt[3]{8x^6y^2z} + \sqrt[3]{27x^3y^2z}$
$2x^2\sqrt[3]{y^2z} + 3x\sqrt[3]{y^2z}$
$(2x^2+3x)\sqrt[3]{y^2z}$

29. $\sqrt[3]{\frac{5}{y} + \frac{9}{y^2}} = \sqrt[3]{\frac{5}{y} + \frac{3}{y}}$
$= \sqrt[3]{\frac{8}{y}} \cdot \frac{\sqrt[3]{y^2}}{\sqrt[3]{y^2}} = \frac{2\sqrt[3]{y^2}}{y}$

30. $x^{3/4} \cdot y^{1/2} \cdot z$ $x^{3/4}y^{2/4}z$
$z\sqrt[4]{x^3yz}$