

Simplify. Express answers as fractions, integers, or exponentials in simplest form.

$$1. \left(\frac{-27}{8}\right)^{-4/3} \quad 2. \frac{3^{2-3\sqrt{3}}}{3^{\sqrt{12}}} \cdot 3^{\sqrt{75}} \quad 3. \left(5^{1/4} \cdot 5^{2/3}\right)^2$$

$$4. \frac{x^2 y^{-1/5}}{x^{2/3} y^{4/5}} \quad 5. \frac{56^{1/3}}{8^{1/3}}$$

Simplify. Express answers in simplest radical form. Assume that all radicals are defined.

$$6. \sqrt{24x^3} \cdot \sqrt{3x^{10}} \quad 7. \sqrt[5]{320a^7 x^{12}} \quad 8. \sqrt[4]{32n^3 y} \cdot \sqrt[4]{9n^6 y^7}$$

$$9. \sqrt[3]{\sqrt{2x^2}} \cdot \sqrt[4]{\sqrt{2x^4}} \quad 10. \frac{\sqrt[6]{32} \cdot \sqrt[4]{8}}{\sqrt[3]{16}} \quad 11. \sqrt{\frac{8}{7x^3}}$$

$$12. \sqrt[3]{\frac{40}{9y}} \quad 13. 4(45)^{1/2} + (125)^{1/2} \quad 14. 6\sqrt[3]{54} - \sqrt[3]{128}$$

$$15. \frac{\sqrt[3]{4}}{\sqrt[6]{4}} \quad 16. \sqrt{12a^4 - 12a^2 b^2}$$

Solve for x. Round decimals to the nearest hundredth.

$$17. x = \left(\sqrt[4]{100}\right)^{-3} \quad 18. (x-4)^4 = 625 \quad 19. 2x^5 + 7 = 97$$

Perform the function operations and state the domain.

$$20. f(x) = 5x^{1/4} - 3, g(x) = x^{3/8} - 1; \text{ find } f(x) \cdot g(x)$$

$$21. f(x) = 3x^{2/3} + 1, g(x) = x^{-1/3}; \text{ find } f(x) \div g(x)$$

$$22. f(x) = 6\sqrt[5]{x^2} + 3\sqrt{x}, g(x) = 4\sqrt[5]{x^2} - 5\sqrt{x}; \text{ find } f(x) + g(x)$$

$$23. f(x) = 6x^2 - 24, g(x) = x - 2; \text{ find } f(x) - g(x)$$

$$24. f(x) = (1+x)^{1/2}, g(x) = x^2 + 2x; \text{ find } f(g(x))$$

25. Find the inverse of $f(x) = \frac{1}{3}x^4 + 2$. State the domain of the inverse.

26. Graph $y = x^2 + 1$ and its inverse. Is the inverse a function? Why or why not?

27. Verify that $f(x) = \sqrt[3]{4x-8}$ and $g(x) = \frac{x^3+8}{4}$ are inverses of each other.

28. Solve for F : $R = \sqrt{\frac{km}{F}}$

Solve for x . Be sure to check for extraneous solutions.

29. $2x^{-3/5} - 7 = -61$ 30. $(2x+3)^{1/3} = 3$ 31. $5(3x-1)^{4/7} - 7 = 73$

32. $2\sqrt{x+4} - 1 = x$ 33. $\sqrt[3]{2x-1} = \sqrt{x+1}$ 34. $\sqrt{3x-2} - \sqrt{2x+5} = 1$

35. Use the data set 6, 22, 4, 15, 10, 8, 8, 7, 14, 20.

Find the (a) mean, (b) median, (c) mode, (d) range, and (e) standard deviation. Construct a box-and-whisker plot for the data.

Make a frequency distribution using 4 intervals, beginning with 0-5.

Make a histogram of the data. Be sure to label the axes.

Graph the following.

36. $y = -3\sqrt{x} + 5$ 37. $y = \frac{1}{2}\sqrt{x-4}$ 38. $y = 2\sqrt{x+3} - 6$

Answers: 1. $\frac{16}{81}$ 2. 9 3. $5^{11/6}$ 4. $\frac{x^{4/3}}{y}$ 5. $7^{1/3}$ 6. $6x^6\sqrt{2x}$ 7. $2ax^2\sqrt{10a^2x^2}$

8. $2n^2y^2\sqrt[4]{18n}$ 9. $12\sqrt[3]{8x^8}$ 10. $\sqrt[4]{2}$ 11. $\frac{2\sqrt{14x}}{7x^2}$ 12. $\frac{2\sqrt[3]{15y^2}}{3y}$ 13. $17\sqrt{5}$

14. $14\sqrt[3]{2}$ 15. $\sqrt[3]{2}$ 16. $2a\sqrt{3a^2-3b^2}$ 17. .03 18. 9, -1 19. 2.14

20. $5x^{5/8} - 5x^{1/4} - 3x^{3/8} + 3, x \geq 0$ 21. $3x+x^{1/3}; x \neq 0$ 22. $10\sqrt[5]{x^2} - 2\sqrt{x}; x \geq 0$

23. $6x^2 - x - 22$, all real numbers 24. $|x+1|$; all real numbers 25. $f^{-1}(x) = \pm\sqrt[4]{3x-6}, x \geq 2$

26. not a function 28. $F = \frac{km}{R^2}$ 29. $\frac{1}{-243}$ 30. 12 31. 43 32. 5 33. $\frac{5}{4}$

34. 22 35. (a) 11.4 (b) 9 (c) 8 (d) 18 (e) 5.8