

Name _____ Period _____ Date _____

NON-CALCULATOR SECTION

Vocabulary: Define each word and give an example.

1. Extraneous Solution
2. Radicand
3. Power Function

Short Answer:

4. Describe what it means for a function to be one-to-one.
5. How do you determine the domain and range of the radical function $f(x) = \sqrt{x-a} + b$?

Review:

6. Factor completely: $16x^3 - 54y^3$
7. Write an equation in standard form for the line perpendicular to $4x - y = -5$ that passes through the point $(-4, -5)$.

8. Find the determinant of the matrix $\begin{bmatrix} 2 & 0 & 1 \\ 3 & 1 & -4 \\ -1 & 2 & -2 \end{bmatrix}$

9. Simplify: $\frac{(x^{-2}y)^3}{(4x^0y^2)^{-2}}$

Problems:

Be sure to show all work used to obtain your answer. Circle or box in the final answer.

10. Evaluate the expression:

a. $\sqrt[3]{-125}$

b. $-27^{2/3}$

c. $\left(\frac{1}{216}\right)^{-1/3}$

11. Simplify the expression. Assume all variables are positive.

a. $(3^{1/2} \cdot 3^{1/3})$

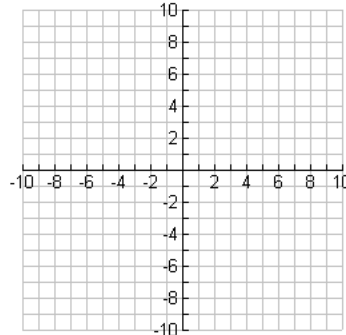
b. $\sqrt[4]{32x^5y^4}$

c. $\left(\frac{27x^6}{8y^{12}}\right)^{2/3}$

d. $\sqrt[3]{54} + \sqrt[3]{2}$

12. Graph the radical function. State the domain and range

$$y = \sqrt[3]{x-3} - 1$$

13. Let $f(x) = 1 + \sqrt{x}$ and $g(x) = x - 3$.a. Find $\frac{f(x)}{g(x)}$. State its domain.b. Find $f(x) \cdot g(x)$. State its domain.c. Find $f(g(x))$. State its domain.

14. Find an equation for the inverse of the function: $f(x) = (x-7)^{1/3}$

15. Find the inverse of the relation: $f = \{(0, 5), (2, -1), (-6, -3)\}$

16. Solve the equations:

a. $5 = -\sqrt{7y-3}$

b. $\sqrt{3x} = \sqrt{x+6}$

c. $x+5 = \sqrt{3x+13}$

d. $2(1-3x)^{1/3} + 4 = 6$

e. $\sqrt{x^2+x-3} = 3$

f. $(2x+1)^{2/3} = 16$

Multiple Choice Section: **Circle the best answer.**

17. What is the simplified form of the expression $\sqrt[3]{4a^6} + a\sqrt[3]{108a^3}$?

- A. $4a^2\sqrt[3]{4}$
- B. $2a^2\sqrt[3]{14}$
- C. $2a^2 + 3a\sqrt[3]{4}$
- D. $2a^3 + 6a^2\sqrt[3]{3a}$

18. Let $f(x) = 2x^2$ and $g(x) = 4x - 3$. Which expression is equivalent to $(f \circ g)(x)$?

- A. $2x^2 + 4x - 3$
- B. $8x^3 - 6x^2$
- C. $8x^2 - 3$
- D. $32x^2 - 48x + 18$

19. Which is the inverse of the function $k(x) = 4x^2 - 16$ for $x \geq 0$?

- A. $k^{-1}(x) = \sqrt{\frac{x}{4} + 4}$
- B. $k^{-1}(x) = \frac{\sqrt{x+4}}{2}$
- C. $k^{-1}(x) = \sqrt{x+4}$
- D. $k^{-1}(x) = \frac{\sqrt{x+16}}{4}$

20. You are trying to determine the height of a regular truncated pyramid that cannot be measured directly. The height h and slant height s of a truncated pyramid are related by the formula $s = \sqrt{h^2 + \frac{1}{4}(b_2 - b_1)^2}$, where b_1 and b_2 are the lengths of the upper and lower bases of the pyramid, respectively. If $s = 5$, $b_1 = 2$, and $b_2 = 4$, what is the height of the pyramid?

- A. 2
- B. 4
- C. $\sqrt{6}$
- D. $\sqrt{24}$

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CALCULATOR SECTION

21. Find the approximate value of $\sqrt[4]{26}$.
22. Solve the equation $\frac{1}{3}x^2 - 8 = \sqrt{x-2}$ by graphing.
23. The velocity of sound in air is given by the equation $v = 20\sqrt{273+t}$ where v is the velocity in meters per second and t is the temperature in degrees Celsius. Find the temperature when the velocity of sound in air is 315 meters per second. Round the answer to the nearest degree.
24. The volume of a dodecahedron (a solid with 12 regular pentagons as faces) is $V \approx 7.66312a^3$, where a is the length of an edge. Find the edge length of a dodecahedron whose volume is 1000 cubic centimeters.
25. The sales of a certain product after an initial release can be found by the equation $s = 14\sqrt{6t} + 42$, where s represents the total sales and t represents the time in weeks after release. How many weeks will pass before the product sells about 200 units? Round your answer to the nearest week.