Name_____ Period_____ Date_____

NON-CALCULATOR SECTION

Vocabulary: Define each word and give an example.

1. Rational Exponent

2. Root Index

3. One-to-One Function

Short Answer:

4. How can we verify inverse functions graphically?

5. Describe how *a, h and k* affect the graph of the function: $f(x) = a\sqrt{x-h}+k$?

Review:

6. Solve the equation: $\frac{x+12}{3} = \frac{2x+3}{x+2}$

7. Factor completely: $4t^6 - 20t^4 + 24t^2$

8. Using degree and the sign of the leading coefficient, describe the end behavior of the following polynomial: $f(x) = -5x^5 + 2x^3 - x^2 + 3x - 1$

9. Identify the vertical and horizontal asymptotes of the function: $f(x) = \frac{2x^2}{x^2-9}$

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

10. Evaluate the expression:

a. $\left(\sqrt[3]{-64}\right)^4$ b. $25^{\frac{3}{2}}$ c. $\left(\frac{1}{216}\right)^{-1/3}$

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

a. $\sqrt[3]{54}+\sqrt[3]{2}$ b. $\left(\frac{20^{\frac{1}{2}}}{5^{\frac{1}{2}}}\right)^3$

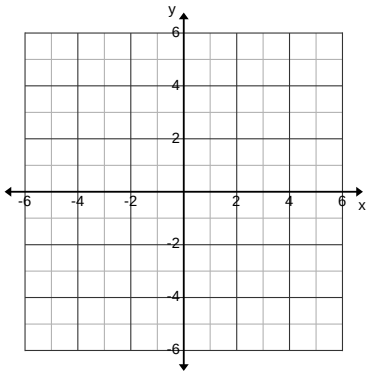
c. $\sqrt{\frac{80x^3y^2}{9xz^3}}$ d. $\left(\sqrt{2}-3\sqrt{3}\right)\left(\sqrt{8}+2\sqrt{3}\right)$

12. Solve the equations:

a. $x-3=\sqrt{30-2x}$ b. $\sqrt{5x+3}=\sqrt{3x+7}$ c. $\sqrt{x+2}=2-\sqrt{x}$

d. $9+5(2m)^{\frac{1}{3}}=29$ e. $-54=10-(m-10)^{\frac{3}{2}}$ f. $-4\sqrt[3]{x+10}+3=15$

13. a) Find an equation for the inverse of the function: $f(x) = 2x - 3$



b) Verify graphically that the two functions are inverses.

14. Verify algebraically that the following functions are inverses.

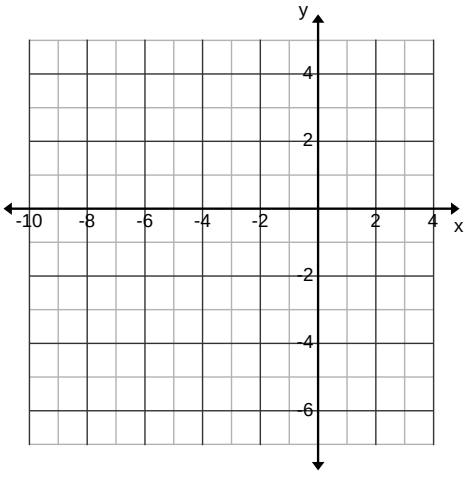
$f(x) = 2x^3 - 1$ and $g(x) = \sqrt[3]{\frac{x+1}{2}}$

15. Graph the radical functions. Also, state the domain and range

a. $y = 3\sqrt[3]{x+4} - 1$

D:

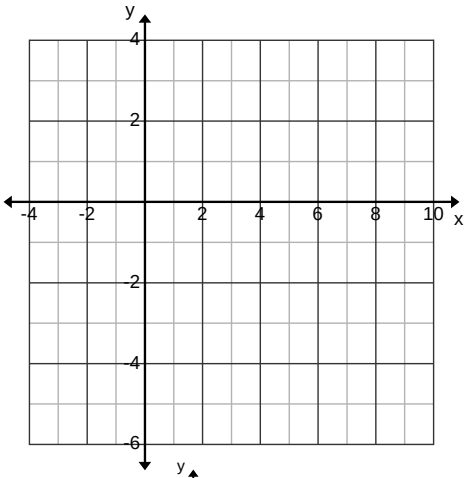
R:



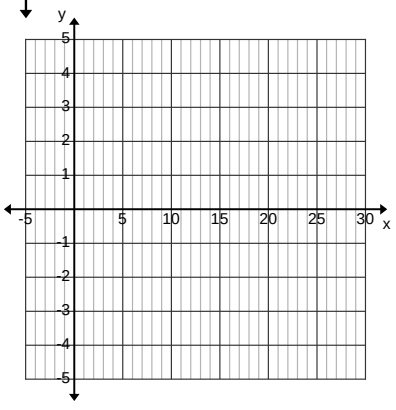
b. $y = -2\sqrt{x-3} + 2$

D:

R:



16. Describe the transformations performed on $f(x) = \sqrt{x}$ to transform it to $g(x) = \frac{1}{2}\sqrt{x-2} + 4$ and then graph it.



MULTIPLE CHOICE QUESTIONS

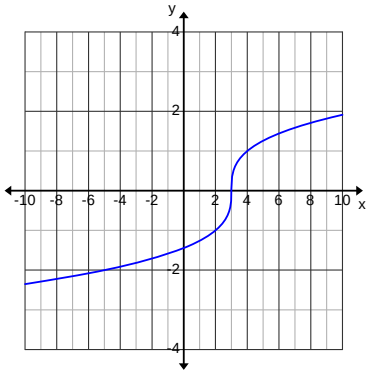
17. What is the simplified form of the expression $\sqrt[3]{4a^6} + a\sqrt[3]{108a^3}$?

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

18. Which is the inverse of the function $y = -2x^5 + 10$?

A. $y = \sqrt[5]{5 - \frac{1}{2}x}$
B. $y = 20 - \sqrt[5]{2x}$
C. $y = \sqrt[5]{2x} - 20$
D. $y = \sqrt[5]{\frac{1}{2}x - 5}$

19. The graph of which function is shown?



A. $y = \sqrt[3]{x+3}$
B. $y = \sqrt[3]{x} + 3$
C. $y = \sqrt[3]{x-3}$
D. $y = \sqrt[3]{x} - 3$

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CALCULATOR SECTION

1. Find the approximate value of $\sqrt[5]{52}$.

2. Solve the equation $\frac{1}{3}x^2 - 8 = \sqrt{x-2}$ by graphing.

3. You have a beach ball that has a volume of approximately 7240 cubic inches. Find the radius of the beach ball. (HINT: Use the formula $V = \frac{4}{3}\pi r^3$ for the volume of a sphere.)

4. The formula $S = 2\pi\sqrt{\frac{L}{32}}$ represents the swing of a pendulum. *S* is the time in seconds to swing back and forth, and *L* is the length of the pendulum in feet.

   a) How long does it take for a 3 foot pendulum to swing back and forth? (Round to three decimal places)

   b) Solve the formula for *L*.

   c) Find the length of a pendulum that makes one swing in 2.5 seconds. (Round to three decimal places)