



Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

## NON-CALCULATOR SECTION

Vocabulary: Define each word and give an example.

1. Extraneous Solution
2. Radicand
3. Inverse functions

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. Solve by completing the square:  $x^2 + 8x + 22 = 0$
8. Using degree and the sign of the leading coefficient, describe the end behavior of the following polynomial:  $f(x) = -5x^4 + 2x^3 - x^2 + 3x - 1$
9. Find  $f(2)$  if  $f(x) = \begin{cases} x, & \text{if } x \geq 2 \\ 5, & \text{if } -3 < x < 2. \\ 3x + 2, & \text{if } x \leq -3 \end{cases}$



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.  $\left(3^{\frac{1}{2}} \cdot 3^{\frac{1}{3}}\right)$

b.  $\sqrt[5]{32x^6y^5}$

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

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

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

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

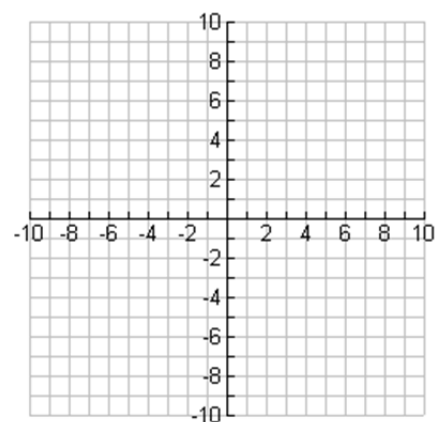
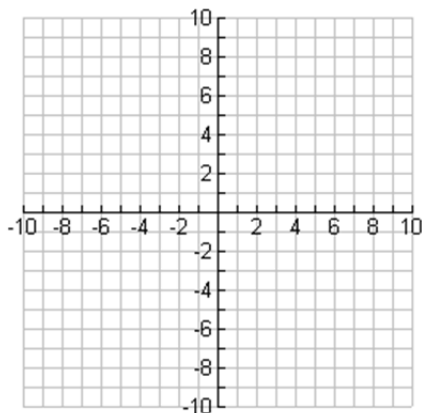
b.  $y = 2\sqrt{x+4} - 3$

D:

D:

R:

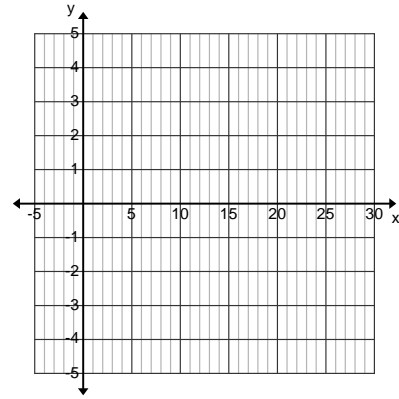
R:





13. Describe the transformations performed on  $f(x) = \sqrt{x}$  to

make it  $g(x) = -\frac{1}{2}\sqrt{x-2} + 4$  and then graph it.



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

15. Find the inverse of  $f(x) = 2\sqrt{x+5} - 3$  and verify it by composition.

16. Solve the equations and inequalities:

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





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## CALCULATOR SECTION

1. Find the approximate value of  $\sqrt[4]{26}$ .
2. Solve the equation  $\frac{1}{3}x^2 - 8 = \sqrt{x-2}$  by graphing.
3. 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.
4. 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.
5. 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.
6. Biologists have discovered that the shoulder height  $h$  (in centimeters) of a male African elephant can be modeled by  $h = 62.5\sqrt[3]{t} + 75.8$  where  $t$  is the age (in years) of the elephant. Find the age of an elephant whose shoulder height is 180 centimeters.