Alg. 2 Unit 10 Name:_____

Day 1 Worksheet – Function Operations Date:_____Period:_____

<u>Perform the function operations using the functions below.</u>

$f(x) = x^2 - 4$ $g(x) = 3x^2$ $h(x) = 3x - 1$ $k(x) = x^2 + 3x - 10$

1) $f(x) + k(x)$

2) $h(x) - k(x)$

3) $\dfrac{k(x)}{f(x)}$

4) $\dfrac{f(x)}{k(x)}$

5) $f(x) \bullet h(x)$

6) $g(x) - f(x)$

7) $f(x) \bullet k(x)$

8) $\dfrac{k(x)}{g(x)}$

9) $g(x) \bullet k(x)$

<u>State the domain for problems 7 – 9.</u>

10) Domain #7_____ **11)** Domain #8_____ **12)** Domain #9_____

<u>Perform the function operations for the functions below.</u>

$a(x) = -2x$ $b(x) = \dfrac{3x^2}{2}$ $c(x) = x^2 + x - 2$

13) $\dfrac{a(x)}{c(x)}$

14) $a(x) \bullet b(x)$

15) $a(x) - c(x)$

<u>State the domain for problems 13 – 15.</u>

16) Domain #13_____ **17)** Domain #14_____ **18)** Domain #15_____

Alg. 2 Unit 10 Name:_____

Day 2 Worksheet – Composition of Functions Date:_____Period:_____

Perform the function compositions below using the following functions.

$b(x)=\sqrt{3x}$ $c(x)=2x^2-3$ $d(x)=-x^2$ $j(x)=-2x^{\frac{1}{2}}$

1) $c\left(b\left(x\right)\right)$ **2)** $c\circ c$ **3)** $c\left(j\left(x\right)\right)$

4) $d\left(b\left(x\right)\right)$ **5)** $d\circ j$ **6)** $c\left(d\left(x\right)\right)$

State the domain for problems 4 – 6.

7) Domain #4_____ **8)** Domain #5_____ **9)** Domain #6_____

Evaluate the following composite functions for the given value.

10) $d\left(c\left(3\right)\right)$ **11)** $\left(j\circ b\right)\left(27\right)$ **12)** $c\left(j\left(6\right)\right)$

Perform the function compositions below using the following functions.

$g(x)=8x^{\frac{1}{2}}$ $h(x)=x^2-9$ $k(x)=3-2x$

13) $k\left(k\left(x\right)\right)$ **14)** $h\left(g\left(x\right)\right)$ **15)** $h\circ k$

Evaluate the following composite functions for the given value.

16) $h\left(g\left(9\right)\right)$ **17)** $\left(g\circ h\right)\left(5\right)$ **18)** $\left(g\circ k\right)\left(-12\right)$

Alg. 2 Unit 10 Name:_____

Day 3 Worksheet – Inverse Functions Date:_____Period:_____

<u>Graph the following functions on your calculator and determine if they are functions or not.</u>

1. $y=(x-2)^{\frac{1}{2}}+4$

2. $f(x)=\pm|x+2|$

3. $y=3\cos(x)$

<u>Find the inverse of the following functions.</u>

4. $y=-2x-6$

5. $f(x)=\frac{x}{3}+1$

6. $y=3(x-2)$

7. $y=\frac{1}{4}x+7$

8. $g(x)=\frac{x-3}{4}-5$

9. $d(t)=-2(t+4)-3$

10. $y=x^2-9$

11. $f(x)=2x^3+6$

12. $g(x)=2x^2$; when $x\geq 0$

13. $f(x)=\frac{x^4}{4}-3$

14. $y=\sqrt{x-2}$

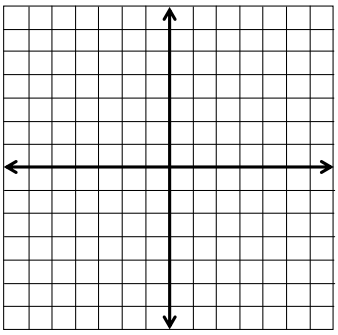
15. $h(t)=30-3t^2$; when $x<0$

Alg. 2 Unit 10 Name:_____

Day 4 Worksheet – Graph Square Root Functions Date:_____Period:_____

<u>Graph the following radical functions using a table, and then state the domain and range.</u>

1. $y=\sqrt{x}+2$

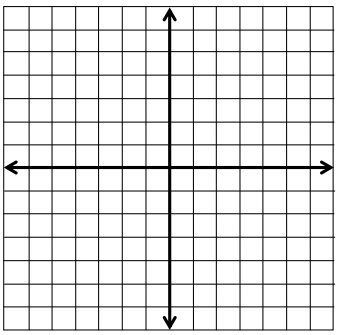


Domain:

Range:

x				
y				
a				

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



Domain:

Range:

x				
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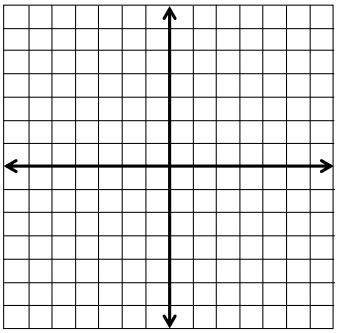
3. $g(x)=(x+4)^{\frac{1}{2}}-1$



Domain:

Range:

x				
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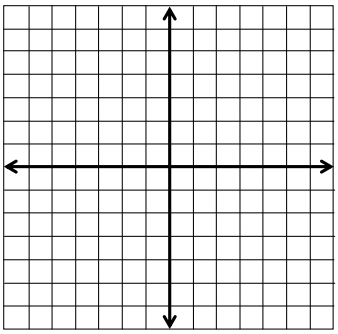
4. $y=\sqrt{x-2}-5$

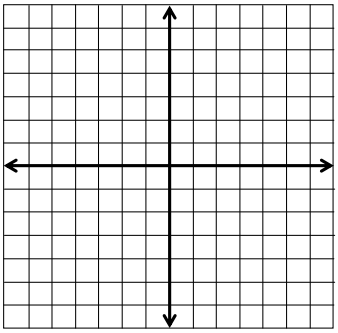


Domain:

Range:

x				
y				
a				

5. $f(x)=-\sqrt{x}$



Domain:

Range:

x				
y				
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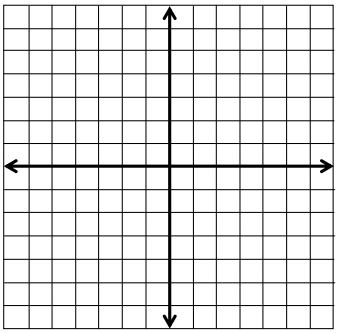
6. $y=-(x-2)^{\frac{1}{2}}+4$

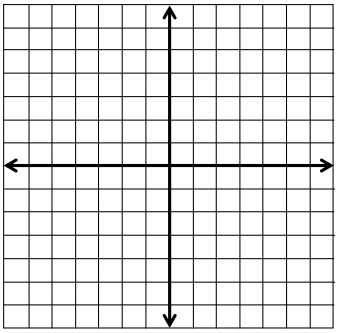


Domain:

Range:

x				
y				
a				

7. $h(x) = 3x^{\frac{1}{2}}$



Domain:

Range:

x				
y				
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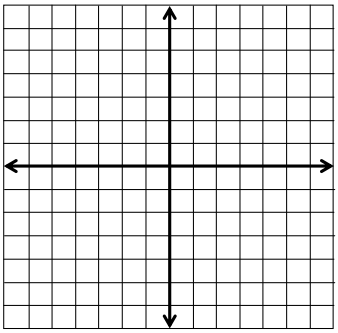
8. $y = -2x^{\frac{1}{2}} + 6$

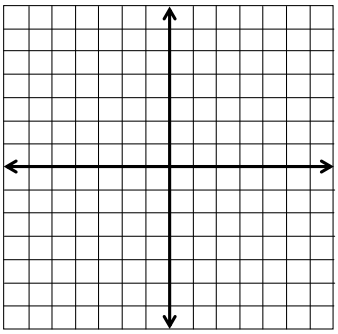


Domain:

Range:

x				
y				
a				

9. $y = \frac{1}{2}\sqrt{x+6}$

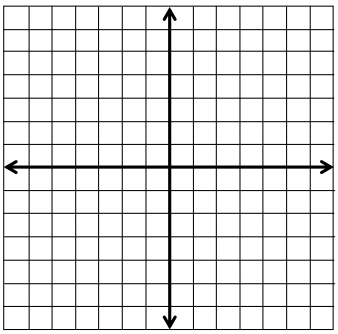


Domain:

Range:

x				
y				
a				

10. $f(x) = -4\sqrt{x+5} - 1$

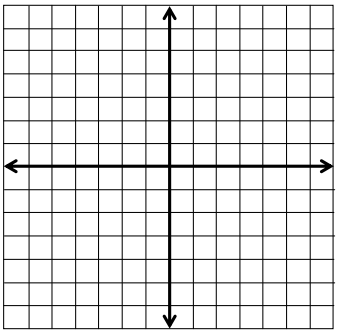


Domain:

Range:

x				
y				
a				

11. $y = -(x+4)^{0.5}$



Domain:

Range:

x				
y				
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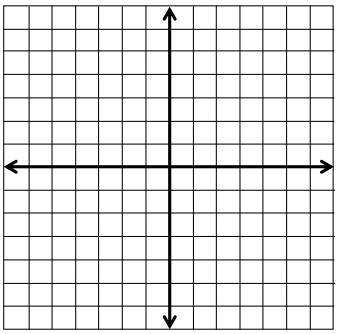
12. $g(x) = (x+4)^2 - 1$



Domain:

Range:

x				
y				
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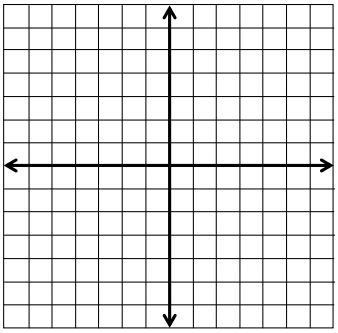
Alg. 2 Unit 10 Name:_____

Day 5 Worksheet – Graph Cube Root Functions Date:_____Period:_____

<u>Graph the following radical functions using a table, and then state the domain and range.</u>

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

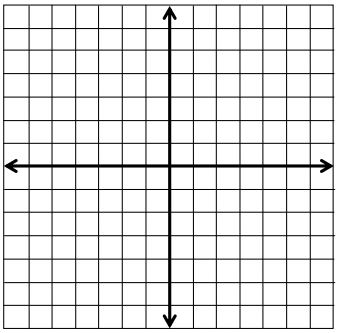


Domain:

Range:

x				
y				
a				

2. $f(x)=(x-1)^{\frac{1}{3}}+4$



Domain:

Range:

x				
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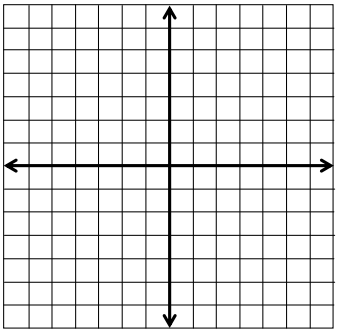
3. $f(x)=(x-3)^{\frac{1}{3}}$



Domain:

Range:

x				
y				
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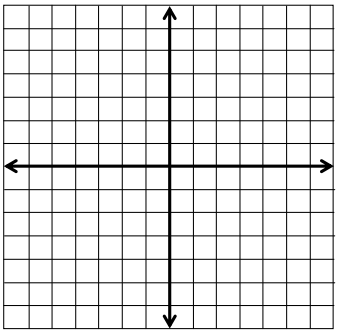
4. $f(x)=\sqrt[3]{x}+2$



Domain:

Range:

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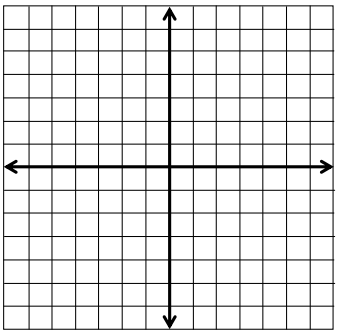
5. $y=3\sqrt[3]{x-3}-1$



Domain:

Range:

x				
y				
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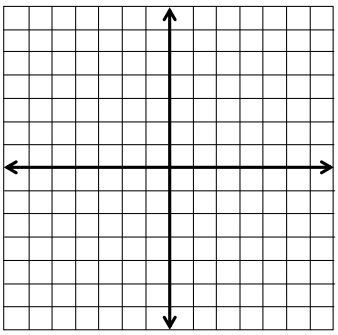
6. $f(x)=-2(x+1)^{\frac{1}{3}}$

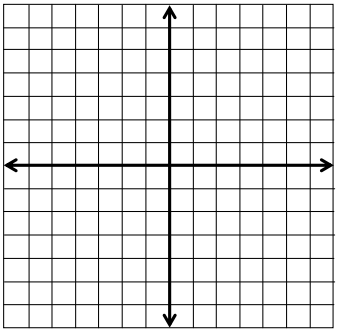


Domain:

Range:

x				
y				
a				

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



Domain:

Range:

x				
y				
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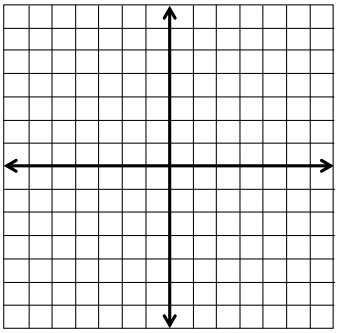
8. $f(x) = 2(x+5)^{\frac{1}{3}} + 2$

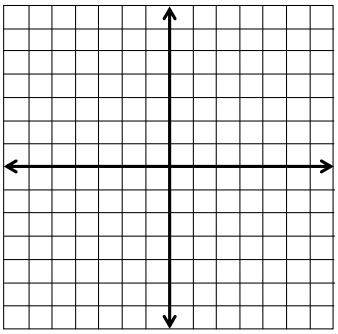


Domain:

Range:

x				
y				
a				

9. $f(x) = 3x^{\frac{1}{3}} - 2$

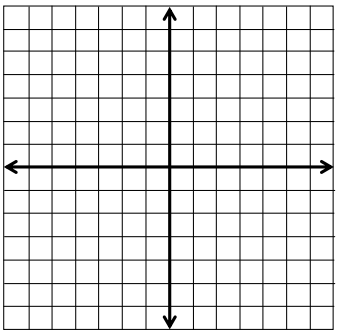


Domain:

Range:

x				
y				
a				

10. $f(x) = -2\sqrt[3]{x+3}$

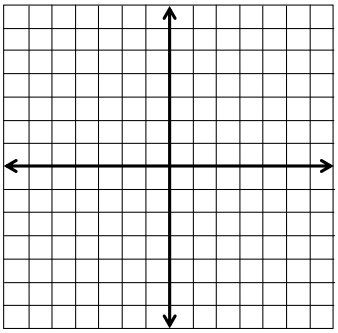


Domain:

Range:

x				
y				
a				

11. $f(x) = -2(x+1)^{\frac{1}{2}}$

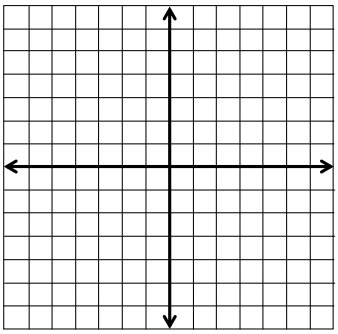


Domain:

Range:

x				
y				
a				

12. $f(x) = -2(x+1)^{3}$



Domain:

Range:

x				
y				
a				

Algebra 2 Name:_____

Day 6 – Interpreting Square root and Cube Root Functions + Unit 10 Review of Days 1 – 6

<u>Perform the function operations using the functions below.</u>

$f(x) = 2x^2$ $g(x) = x^2 - 9$ $h(x) = 5x + 10$ $k(x) = x^3 - 16x$

1) $h(x) - k(x)$ 2) $\dfrac{f(x)}{k(x)}$ 3) $f(g(x))$ 4) $g(g(-3))$

<u>State the domain for problems 7 – 9.</u>

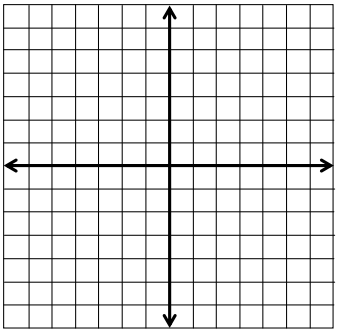
5) Domain #2_____

<u>Find the inverse of the following functions.</u>

6) $g(x) = \dfrac{x+2}{3} - 4$ 7) $y = x^2 - 36$ 8) $g(x) = 3(x-2)^2;$ when $x \geq 0$

<u>Graph the function and state the domain and range.</u>

9. $y = \sqrt[3]{x+1} + 2$

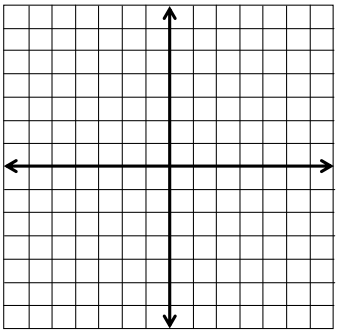


Domain:

Range:

x				
y				
a				

10. $y = 2(x+3)^{\frac{1}{2}} + 4$



Domain:

Range:

x				
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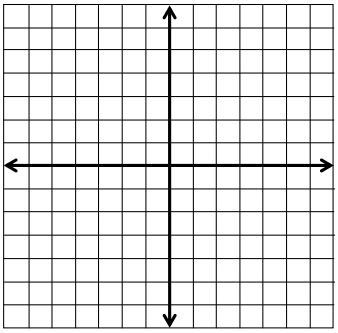
11. $f(x) = -3\sqrt{x+1} + 2$



Domain:

Range:

x					
y					

12. If the graph of $y = \frac{1}{3}\sqrt[3]{x}$ is shifted up 3 units, what is the equation of the translated graph?

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

b. $y = \frac{1}{3}\sqrt[3]{x} + 3$

c. $y = \frac{1}{3}\sqrt[3]{x+3}$

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

<u>State the domain and range of the following functions without graphing.</u>

13. $f(x) = \sqrt{x+25} - 16$

Domain:_____

Range:_____

14. $f(x) = \frac{1}{3}\sqrt[3]{x+16} - 4$

Domain:_____

Range:_____

15. $f(x) = -5(x+12)^{\frac{1}{2}} + 100$

Domain:_____

Range:_____

16. In order to compete in the America's Cup sailboat race, a boat must satisfy the rule $b + 1.25\sqrt{s} - 9.8\sqrt[3]{d} = 16$, where *b* is the length (in meters) of the boat, *s* is the area (in square meters) of the sails, and *d* is the volume (in cubic meters) of water displaced by the boat. If Mr. Foster has a boat that is 20 meters long, and displaces 27 cubic feet of water, what area must his sails have?

Mixed Review:

<u>Simplify the expressions and assume all variables are positive.</u>

17. $\sqrt[5]{96m^7n^5p^3}$

18. $9\sqrt{32} - 7\sqrt{18} + 2\sqrt{50}$

19. $\sqrt{\frac{36x^5}{121x^7}}$

20. Solve: $3x^3 - 3x^2 - 60x = 0$

Alg. 2 Unit 10 **Name:_____**

Day 7 Worksheet – Solve Radical Functions **Date:_____Period:_____**

<u>Solve the following radical equations.</u>

1. $\sqrt{x+5}=2$

2. $\sqrt[3]{x-9}=6$

3. $\sqrt{4x+1}+8=13$

4. $\sqrt[3]{5x-6}+1=3$

5. $2\sqrt[3]{4x}+8=4$

6. $\frac{1}{2}\sqrt[3]{5x}+4=6$

7. $\sqrt{-x^2-14x}=7$

8. $\sqrt{x^2+9x+14}=6$

9. $\sqrt{-5x+24}=x$

10. $\sqrt[3]{9x}=x$

11. $2\sqrt[4]{2x-8}+1=9$

12. $\sqrt[3]{x+7}=5$

13. $\sqrt{x+4}-\sqrt{2x+9}=0$

14. $\sqrt{x^2}-\sqrt{3x-2}=0$

Alg. 2 Unit 10 Name:_____

Day 8 Worksheet – Solve More Radical Equations Date:_____Period:_____

<u>Solve the following radical equations.</u>

1. $\sqrt{x+25}+4=8$

2. $2\sqrt[3]{x-3}=4$

3. $\sqrt{10x+9}=x+3$

4. $\sqrt{7x+15}=x+1$

5. $(x+3)^{5/2}=32$

6. $(x+2)^{3/4}-1=7$

7. $-\frac{2}{3}x^{1/5} = -2$

8. $(x+2)^{1/3} + 3 = 7$

9. $(4x+24)^{\frac{1}{2}} = x-2$

10. $\sqrt{2x+5} = \sqrt{x+7}$

11. $\sqrt{x+6} - 2 = \sqrt{x-2}$

12. $\sqrt{x+2} + 1 = \sqrt{3-x}$

Alg. 2 Unit 10 Name:_____

Day 9 Worksheet – Solve Radicals (Calculator) Date:_____Period:_____

Solve the radical equations algebraically.

1. $\sqrt{x-3}=7$

2. $\sqrt{x^2-10}=\sqrt{x+2}$

3. $\sqrt{3x-2}=x-2$

Solve the radical equations using a table.

4. $\sqrt{2x-5}=3$

5. $\sqrt{7x-5}-4=6$

6. $\sqrt{6x+6}=2\sqrt{x+4}$

Solve the radical equations using a graph.

7. $\sqrt{11x+3}=5$

8. $3\sqrt{x+4}=9.7$

9. $\sqrt[3]{x+2}=3\sqrt{x}-4$

10. On a clear day, the approximate distance, *d*, in feet that a sightseer standing at the top of a building, *h* feet tall can see is given by $d=6397.23\sqrt{h}$. On a clear day, a sightseer at the top of a building can see a distance of 191,916 feet. What is the height of the building that the sightseer is on top of?

Algebra 2 Unit 10 Review #1

Name:_____
Date:_____**Period:**_____

Perform the indicated operations using the functions $f(x) = 2x + 4$ and $g(x) = 3x^2 + 2x - 8$.

1. $g(x) - f(x)$

2. $\dfrac{g(x)}{f(x)}$ and state the domain

Perform the indicated operations using the functions $f(x) = 2x + 4$ and $g(x) = 3x^2 + 2x - 8$.

3. $f(g(x))$

4. $(f \circ f)(x)$

Evaluate the following functions $f(x) = 2x + 4$ and $g(x) = 3x^2 + 2x - 8$ for the values indicated below.

5. $g(g(-3))$

6. $(g \circ f)(-6)$

Write the equation for the inverse of each function.

7. $y = -3x + 17$

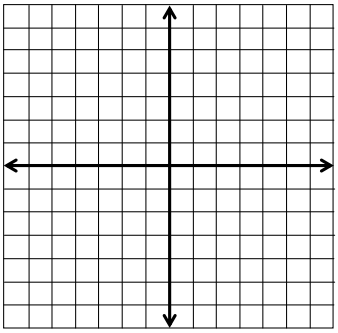
8. $y = x^6 - 7$

9. $2x - y = 6$

10. $y = -\dfrac{1}{4}x^3 + 3$

Graph the function and state the domain and range.

11. $y=\sqrt[3]{x-2}+1$

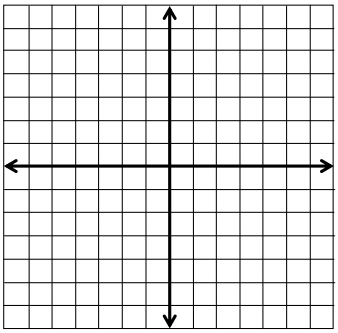


Domain:

Range:

x				
y				
a				

12. $y=-\sqrt{x+4}$



Domain:

Range:

x				
y				
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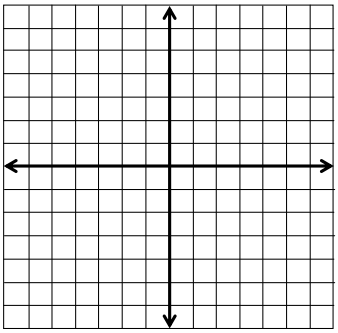
13. $y=2(x+3)^{\frac{1}{2}}-2$

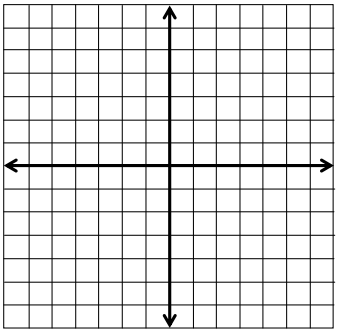


Domain:

Range:

x				
y				
a				

14. $g(x)=-3(x-3)^{\frac{1}{3}}$



Domain:

Range:

x				
y				
a				

State the domain and range of the following functions.

15. $y=-\sqrt{x+6.2}-\dfrac{15}{2}$

D:_____

R:_____

16. $f(x)=(x-55)^{\frac{1}{3}}$

D:_____

R:_____

17. Which of the follow statements are true for the function $(x) = -\sqrt{x+5}$?
Select all that apply.

F. as $x \to +\infty,\ f(x) \to +\infty$

G. as $x \to +\infty,\ f(x) \to -\infty$

H. $f(x)$ is decreasing

I. $f(x)$ is increasing

J. $Domain$: $\{x|all\ real\ numbers\}$

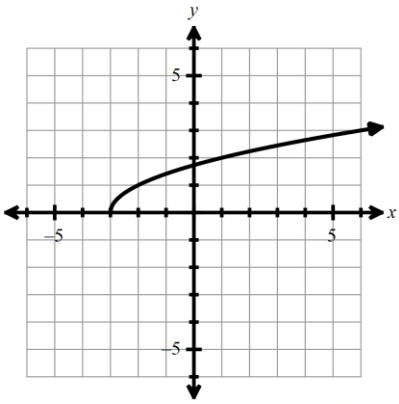
K. $Domain$: $\{x|x \geq -5\}$

L. $Range$: $\{y|all\ real\ numbers\}$

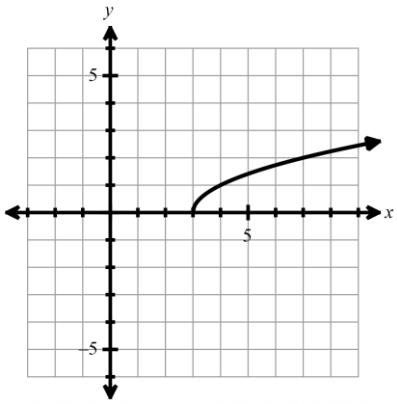
M. $Range$: $\{y|y \leq 0\}$

18. Which of the following represents the graph of $y = \sqrt{x-3}$

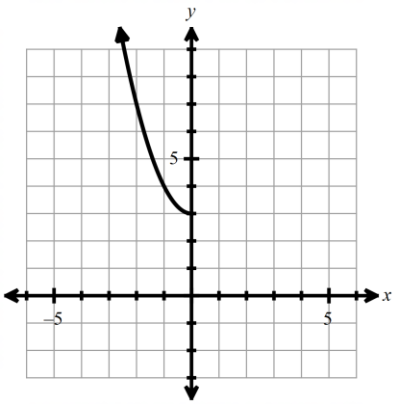
A.



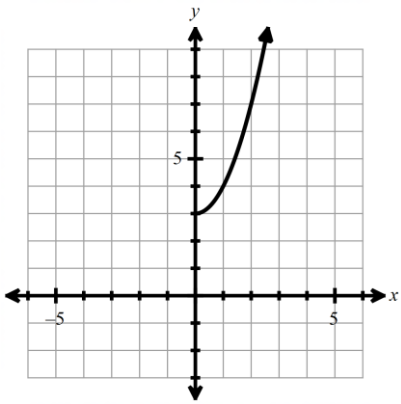
C.



B.



D.



19. Solve: $(x^2 - 4x + 516)^{2/3} = 64$

A. $x = -2, 2$

B. $x = -2$

C. $x = 2$

D. $no\ real\ solution$

20. The height (h, in centimeters) of a baby boy from birth to age 24 months can be modeled $h = 7.7\sqrt{t} + 50$, where t is the age of the baby (in months). How old is a baby that is 72 cm tall? Round your answer to the nearest tenth.

A. 1.4 $months$

B. 1.7 $months$

C. 7.3 $months$

D. 8.2 $months$

21. Find $f(x) - g(x)$ and $f(x) + g(x)$ for $\begin{cases} f(x) = 5x^2 + 6x - 4 \\ g(x) = 3x^2 - 5x + 24 \end{cases}$

A. $f(x) - g(x) = 2x^2 + 11x - 28$
$f(x) + g(x) = 8x^2 + x + 20$

B. $f(x) - g(x) = 2x^2 + 1x + 20$
$f(x) + g(x) = 8x^2 + x + 20$

C. $f(x) - g(x) = 2x^2 + 11x - 28$
$f(x) + g(x) = 8x^2 + 11x - 20$

D. $f(x) - g(x) = -2x^2 - 11x + 28$
$f(x) + g(x) = 8x^2 + x + 20$

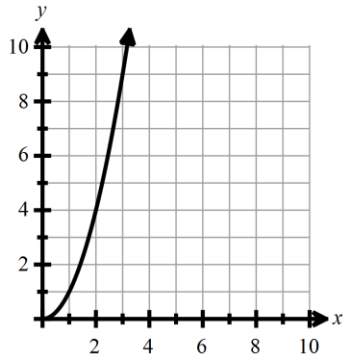
22. Which point lies on the graph of the inverse of the function shown below?

A. $(-1, -1)$

B. $(-2, 4)$

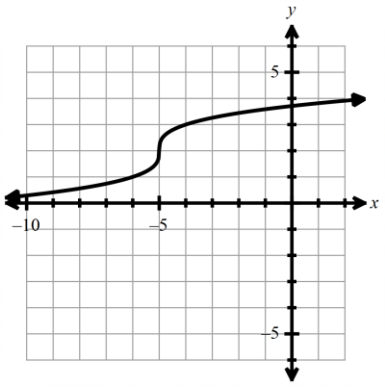
C. $(4, 12)$

D. $(9, 3)$

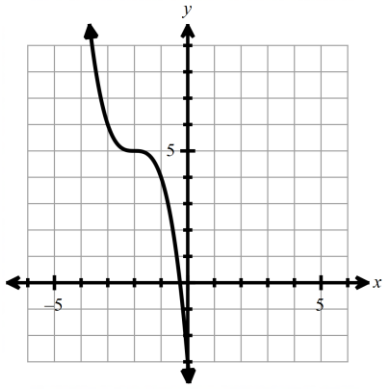


23. Translate the graph of $f(x) = \sqrt[3]{x}$ two units up and five units left. Which of the following is the graph after the translations?

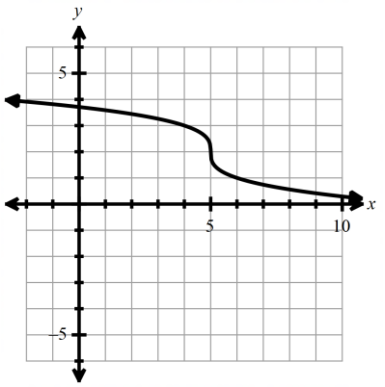
A.



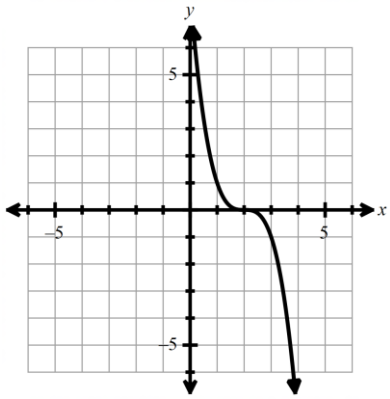
C.



B.



D.



24 Solve: $\sqrt{5x+9} - 10 = 12$

A. $x = 95$

B. $x = 47$

C. $x = -1$

D. *no real solution*

25. Find $g \circ h$ and $h \circ g$ for $g(x) = 5x$ and $h(x) = 3x + 8$

A. $g(h(x)) = 40 - 15x$
$h(g(x)) = 8 - 15x$

B. $g(h(x)) = 15x + 40$
$h(g(x)) = 15x + 8$

C. $g(h(x)) = 15x^2 + 40$
$h(g(x)) = 15x^2 + 8$

D. $g(h(x)) = 15x^2 + 40x$
$h(g(x)) = 15x^2 + 8$

26. Find the inverse function of $f(x) = -7x + 6$.

A. $f^{-1}(x) = 7x - 6$

B. $f^{-1}(x) = \dfrac{-x + 6}{7}$

C. $f^{-1}(x) = 7x + 6$

D. $f^{-1}(x) = \dfrac{x - 6}{7}$

27. Find the inverse function of $g(x) = x^2 + 5$, over the domain $x \geq 0$.

A. $g^{-1}(x) = \sqrt{x - 5}$

B. $g^{-1}(x) = \sqrt{x} - 5$

C. $g^{-1}(x) = x^2 - 5$

D. $g^{-1}(x) = \pm\sqrt{y - 5}$