Graphing Square and Cubed Root Functions

Name:	
Date:	Class:

State the first 7 perfect square numbers?
1, 4, 9, 16, 25, 36, 49

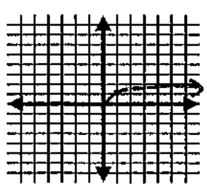
State the first 5 perfect cube numbers?
1, 8, 27, 64, 125, 216, 343

If we had to make a table for $\sqrt{x-1}$ what would be some good numbers to choose to put in for the *x-term*, and why? What are some numbers that won't work, and why?

Graph the following square root function: $y = \sqrt{x+3}$ left 3

*If you can remember the translation(s), parent function, and domain of the function…choosing the corrrect number to start with in the table will save you time.

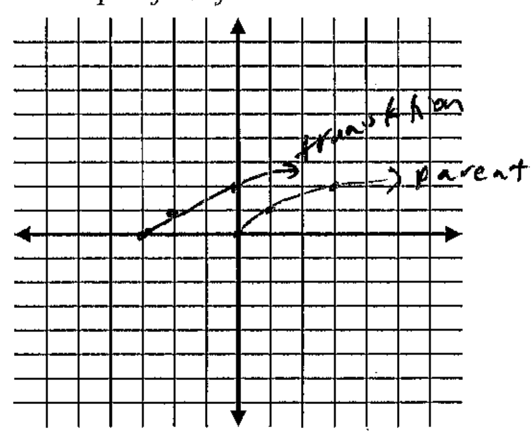
Parent function
$y = \sqrt{x}$



Table

x	y
0	0
1	1
4	2
9	3

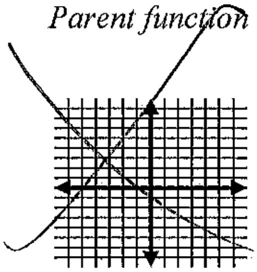
Graph of the function



Graph the following square root function: $y = \sqrt{x-2}+2$ up 2
right 2

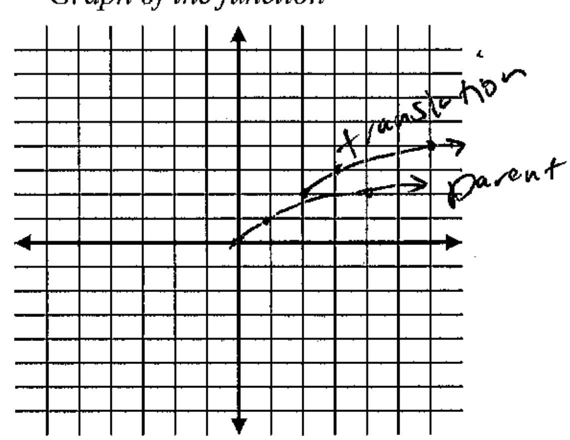
*If you can remember the translation(s), parent function, and domain of the function…choosing the corrrect number to start with in the table will save you time.

Parent function



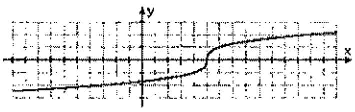
Table

Graph of the function



Here's an example of a cube-root function:

- **Graph** $y = \sqrt[3]{x-5}$



There are no domain constraints with a cube root, because you *can* graph the cube root of a negative number. So you don't have to find the domain; the domain is "all *x*". (Note: Since you can take the fifth root, seventh root, ninth root, etc., of negative numbers, there are no domain considerations for any *odd*-index radical function.

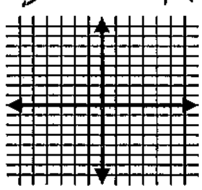
Graph each cubed root function:

left 2

$y = \sqrt[3]{x+2}$ **hint:(Where should the curve take place?)**

Parent function

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

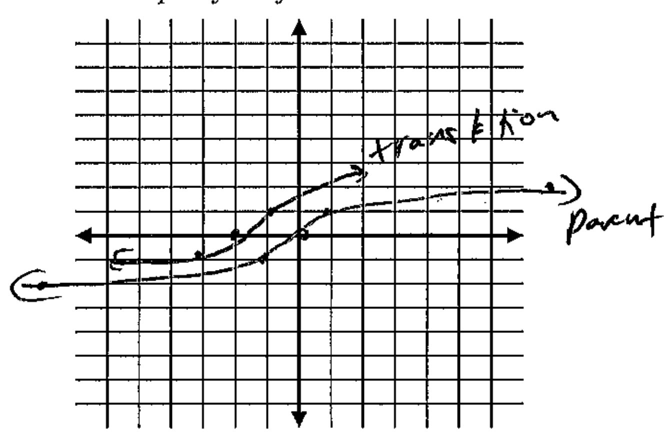


Table

parent

x	y
0	0
1	1
-1	-1
8	2
-8	-2

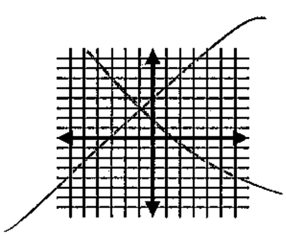
Graph of the function



right 3 down 2

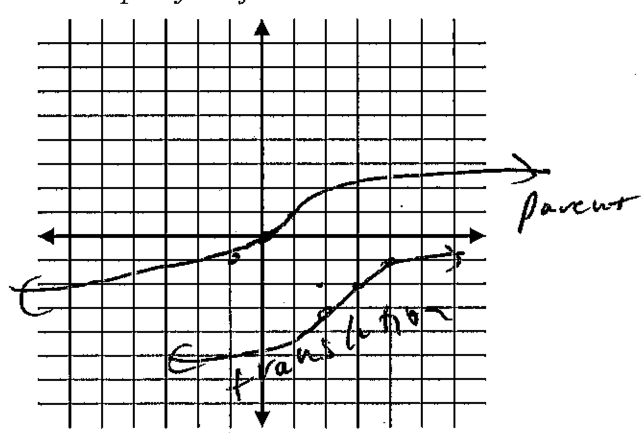
$y = \sqrt[3]{x-3} - 2$ **hint:(Where should the curve take place?)**

Parent function



Table

Graph of the function



Review:

State the translation of each square root function and a number to choose for the x-term in the table.

1.) $y = \sqrt{x+7} + 8$ left 7 up 8

2.) $y = \sqrt{x-5} + 2$ right 5 up 2

3.) $y = \sqrt{x} - 3$ down 3

4.) $y = \sqrt{x+1} - 5$ left 1 down 5

Homework

Find the domain of each function.

1. $f(x) = \sqrt{x - 7}$ **2.** $f(x) = \sqrt{3x - 12}$ **3.** $y = \sqrt{4x + 11}$

4. $y = \sqrt{x - 12}$ **5.** $f(x) = \sqrt{x + 14}$ **6.** $y = \sqrt{x + 8}$

Describe how to translate the graph of $y = \sqrt{x}$ to obtain the graph of each function.

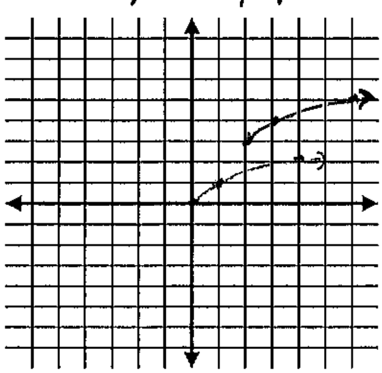
20. $y = \sqrt{x} - 8$
down 8

21. $y = \sqrt{x + 20}$
left 20

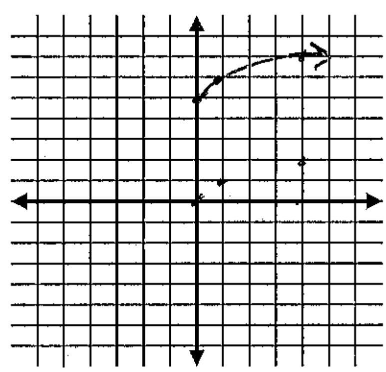
27. $y = \sqrt{x - 4} - 7$
right 4, down 7

Make a table of values and graph each function.

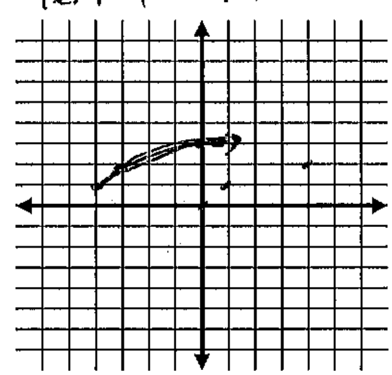
28. $y = \sqrt{x - 2} + 3$
right 2, up 3



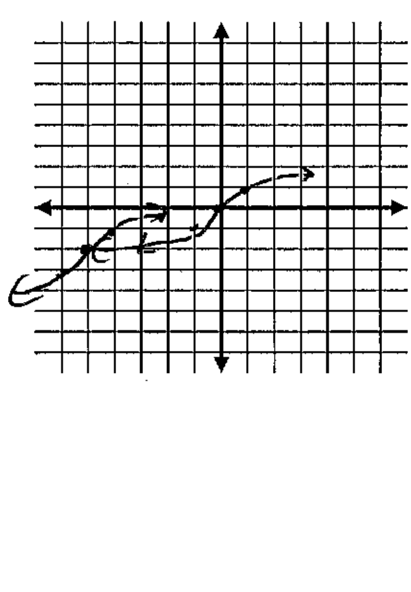
29. $y = \sqrt{x} + 5$
up 5



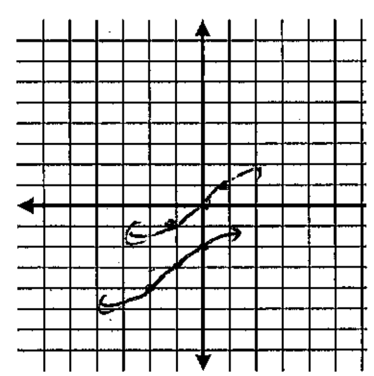
30. $y = \sqrt{x + 4} + 1$
left 4 up 1



31. $y = \sqrt[3]{x + 5} - 2$
left 5 down 2



32. $y = \sqrt[3]{x - 1} - 3$
right 1 down 3

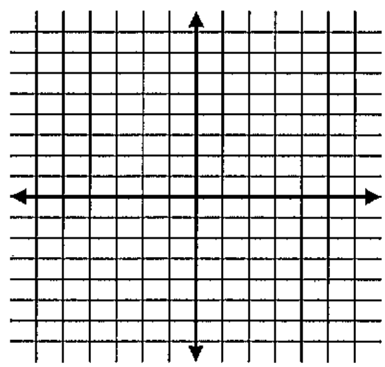


Homework (extra)

1.) Predict what would happen if there was a negative number on the outside of the radical:

$y = -\sqrt{x+2} - 3$ Then graph and restate your prediction of a negative number outside.

left 2
down 3
flip
upside down



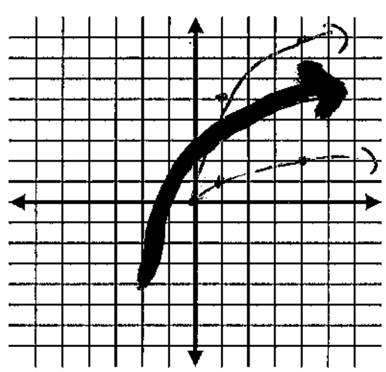
it would
flip the
graph

2.) Predict what would happen if there was a number in front of the radical that was larger or smaller than the "assumed number of *one*".

$y = 5\sqrt{x+2} - 4$ down 4 Then graph and restate your prediction of a number outside the radical.

left 2

5 times
as "tall"



Use what you have learned to state what the translation is of the parent function.

3.) $y = -\sqrt{x-8} + 9$
right 8 up 9

4.) $y = \frac{1}{3}\sqrt{x+3} + 45$
left 3 up 45

5.) $y = -4\sqrt{x-5} - 18$
right 5 down 18

6.) $y = \frac{7}{2}\sqrt{x-3} + 5$
right 3 up 5

7.) If there is a negative sign on the inside of the radical (in front of the x-term), it changes the function in a different way. Use a graphing calculator or graph using a table and discuss why the function starts where it does, does it follow the same "shortcut pattern" for finding the starting point as we used before, and why you think it curves in that direction:

$y = \sqrt{-x+4} + 2$ up 2

left 4

turns left