32. $6\sqrt{20} + 4\sqrt[3]{6} - 7\sqrt{45}$

$20 \to 2,\ 10$; $10 \to 2,\ 5$; $2 \leftarrow$

$6 \to 2,\ 3$

$45 \to 3,\ 15$; $15 \to 3,\ 5$

$12\sqrt{5} + 4\sqrt[3]{6} - 21\sqrt{5}$

$12x - 21x$

$\boxed{-9\sqrt{5} + 4\sqrt[3]{6}}$

28. $32^{\frac{2}{5}}$

$\sqrt[5]{32 \cdot 32}$

$32 \to 2,\ 16$; $16 \to 2,\ 8$; $8 \to 2,\ 4$; $4 \to 2,\ 2$

$2 \cdot 2 = \boxed{4}$

x^3

11-2 Graphing Radical Functions

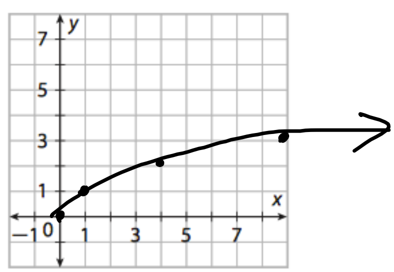
Objectives: $\sqrt{x}$ $\sqrt[3]{x}$

- I can graph square and cube root functions with and without transformations

Graph the following and state the domain, range, and end behavior

x	y
0	0
1	1
4	2

x	$f(x) = \sqrt{x}$
0	$\sqrt{0} = 0$
1	$\sqrt{1} = 1$
4	$\sqrt{4} = 2$
9	$\sqrt{9} = 3$



Domain: $[0, \infty)$

Range: $[0, \infty)$

limit notation

End Behavior

left

$\lim_{x \to 0} f(x) = 0$

$\lim_{x \to \infty} f(x) = \infty$

Transformation Form

neg → refl. y-axis

horiz. stretch HS

recip.

V.S.

$$f(x) = a\sqrt{\boxed{\frac{1}{b}}(x-h)} + k$$

neg → refl. x-axis

R or L

x's lie

U or D

2(x+1)

HS $\frac{1}{2}$

State the transformations

$$g(x) = 2\sqrt{x-3} - 2$$

V.S. by 2
right 3
down 2

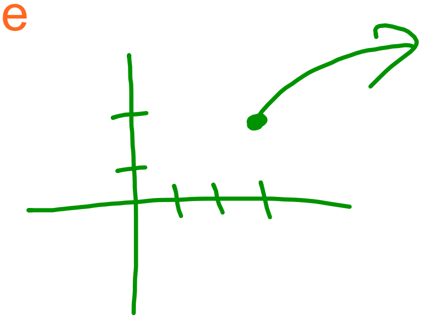
$$f(x) = \sqrt{-\frac{1}{2}(x-2)} + 1$$

reflect y-axis
H.S. by 2
right 2
up 1

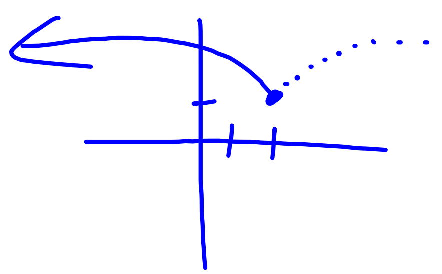
Find the Domain and Range

$$g(x) = 2\sqrt{x-3} - 2$$

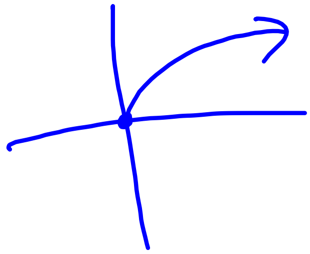
D: [3, ∞)
R: [2, ∞)



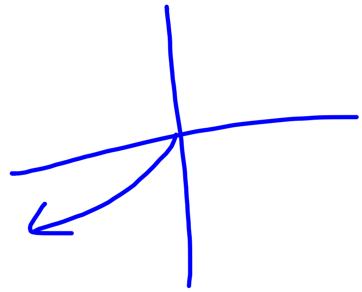
$$f(x) = \sqrt{-\frac{1}{2}(x-2)} + 1$$



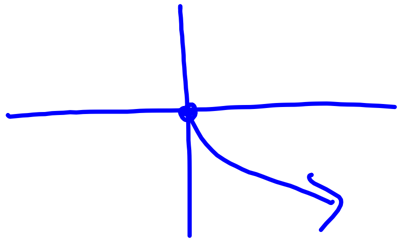
$\sqrt{x} =$



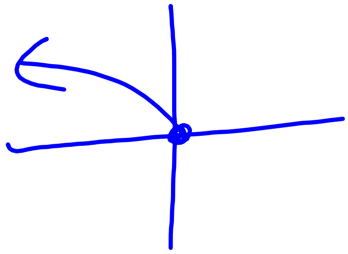
$-\sqrt{-x}$



$-\sqrt{x}$



$\sqrt{-x}$

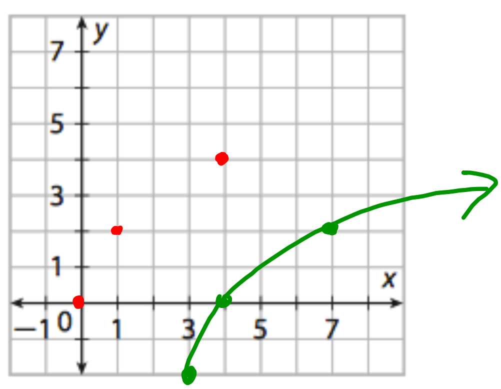


Graph the following and state the end behavior

$$g(x) = 2\sqrt{x-3} - 2$$

Right 3
Down 2

x	y
0	$0 \cdot 2 = 0$
1	$1 \cdot 2 = 2$
4	$2 \cdot 2 = 4$



End Behavior

$$\lim_{x \to 3} f(x) = -2 \qquad \lim_{x \to \infty} f(x) = \infty$$

Graph the following and state the end behavior

$$f(x)=\sqrt{-\frac{1}{2}(x-2)}+1$$

x	y
0	0
1	1
4	2

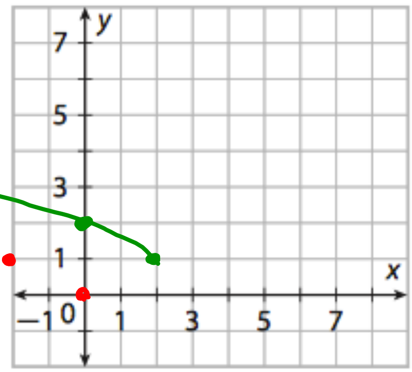
$0 = -2 \cdot 0$

$-2 = -2 \cdot 1$

$-8 = -2 \cdot 4$

right 2

up 1



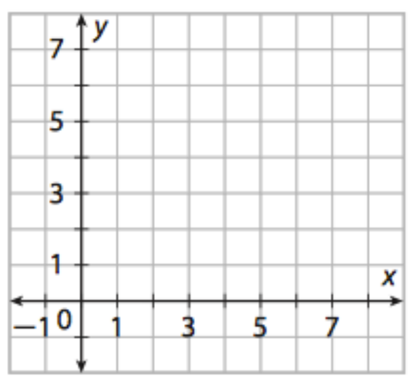
End Behavior

$\lim_{x \to -\infty} f(x) = \infty$

$\lim_{x \to 2} f(x) = 1$

Graph the following and state the end behavior, Domain, Range

$$h(x) = -3\sqrt{x-2}+3$$



Domain

End Behavior

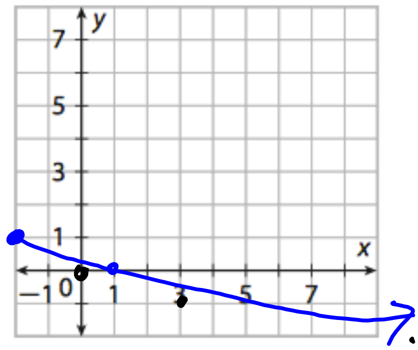
Range

Graph the following and state the end behavior, Domain, Range

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

left 2
up 1

x	y
0 = 3 · 0	0 · -1 = 0
3 = 3 · 1	1 · -1 = -1
12 = 3 · 4	2 · -1 · -2



Domain

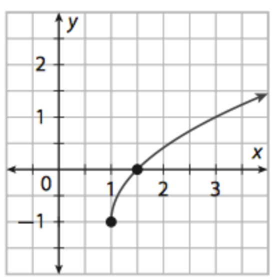
$[-2, \infty)$

End Behavior

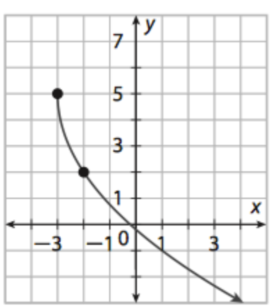
Range

$(-\infty, 1]$

Write a function to represent the following



$f(x) = 2\sqrt{x-1} - 1$



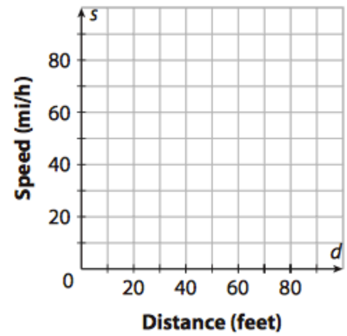
$f(x) = -3\sqrt{x+3} + 5$

A car with good tires is on a dry road. The speed, in miles per hour, from which the car can stop in a given distance d, in feet, is given by $s(d) = \sqrt{96d}$. Use distances of 20, 40, 60, 80, and 100 feet.

First, find the points for the given x-values.

Distance	20	40	60	80	100
Speed					

Plot the points and draw a smooth curve through them.



First interval:

$$\text{rate of change} = \frac{\square - \square}{40 - 20}$$

$$= \square$$

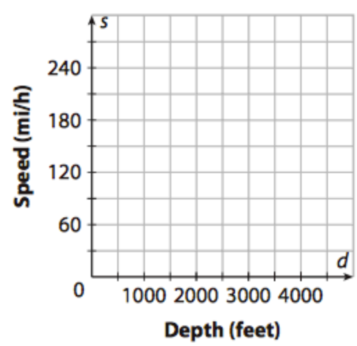
Last Interval:

$$\text{rate of change} = \frac{\square - \square}{100 - 80}$$

$$= \square$$

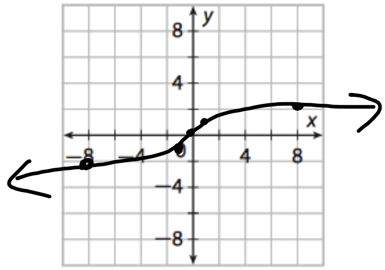
The average rate of change is _______ for the last interval. The average rate of change represents the increase in _________ with each additional ___________________. As the available stopping distance increases, the additional increase in speed per foot of stopping distance ____________.

The speed in miles per hour of a tsunami can be modeled by the function $s(d) = 3.86\sqrt{d}$, where d is the average depth in feet of the water over which the tsunami travels. Graph this function from depths of 1000 feet to 5000 feet and compare the change in speed with depth from the shallowest interval to the deepest. Use depths of 1000, 2000, 3000, 4000, and 5000 feet for the x-values.



Graph the following and state the domain, range, and end behavior $f(x)=\sqrt[3]{x}$

x	y	x, y
-8	$\sqrt[3]{8}=-2$	
-1	$\sqrt[3]{-1}=-1$	
0	$\sqrt[3]{0}=0$	
1	$\sqrt[3]{1}=1$	
8	$\sqrt[3]{8}=2$	



☆Domain: $(-\infty,\infty)$

☆Range: $(-\infty,\infty)$

End Behavior

$\lim_{x\to-\infty} f(x)=-\infty$

$\lim_{x\to\infty} f(x)=\infty$

State the transformations and Domain and Range

$g(x)=2\sqrt[3]{x-3}+5$

D: $(-\infty,\infty)$

R: $(-\infty,\infty)$

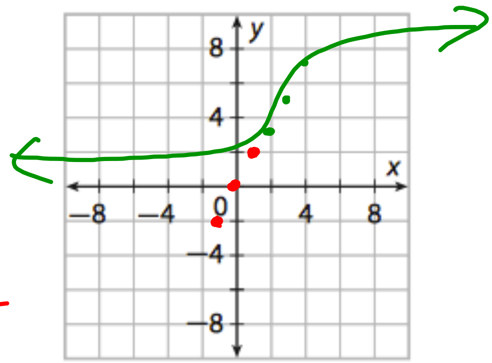
$f(x)=\sqrt[3]{\frac{1}{2}(x-10)}+4$

Graph the following and state the end behavior

$$g(x) = 2\sqrt[3]{x-3} + 5$$

right 3
up 5

x	y	
-1	-1	$\cdot 2 = -2$
0	0	$\cdot 2 = 0$
1	1	$\cdot 2 = 2$



End Behavior

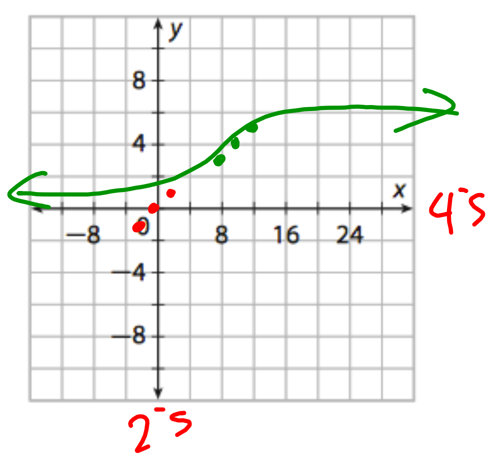
$\lim\limits_{x \to -\infty} f(x) = -\infty$ $\lim\limits_{x \to \infty} f(x) = \infty$

Graph the following and state the end behavior

$$f(x) = \sqrt[3]{\frac{1}{2}(x-10)} + 4$$

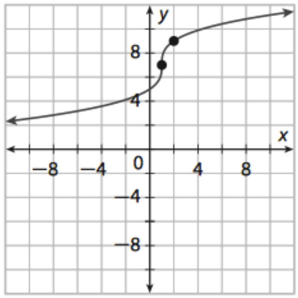
R 10
up 4

	x	y
$-2 = 2\cdot$	-1	-1
$0 = 2\cdot$	0	0
$2 = 2\cdot$	1	1

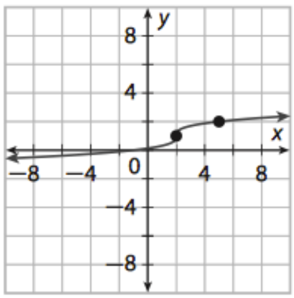


End Behavior

Write an equation to represent the following

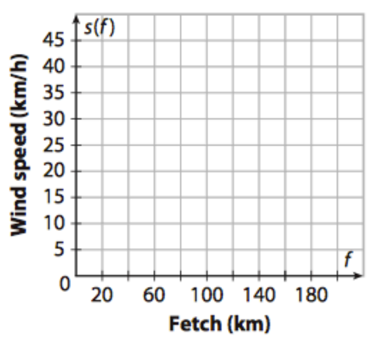


$f(x) = 2\sqrt[3]{x-1} + 7$



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

The fetch is the length of water over which the wind is blowing in a certain direction. The function $s(f) = 7.1\sqrt[3]{f}$, relates the speed of the wind s in kilometers per hour to the fetch f in kilometers. Graph the function and examine its average rate of change over the intervals (20, 80), (80, 140), and (140, 200). What is happening to the average rate of change as the f-values of the intervals increase? Use the function to find the speed of the wind when $f = 64$.



March 30, 2015