

Lesson:

Can you define the domain and range of your algebraic functions?

Domain and Range of Algebraic Functions

Write on the SmartBoard Name the Algebraic Functions You Have Studied

x^2 quadratic ⁿ

x^3 cubic

\sqrt{x} radical

$|x|$ absolute value

x linear

All wrong
:(

$y = e^x$ exponential

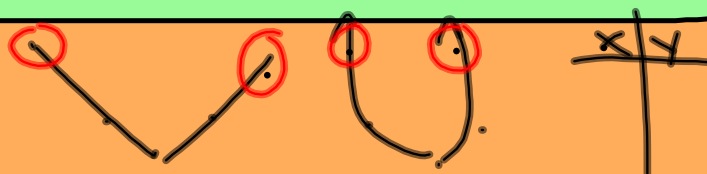
$y = \log x$

$y = a^x$ power
 $y = 1/x$ rational

Now complete the following worksheet.

Requirements:

- 1) you need to graph at least 5 points per problem
- 2) the points from #1 must be exact points (x,y)
- 3) check your answers using the graphing calculator



Linear Graphs

$y = 3$
 $y = a$

Constants

$x = 5$
 $x = a$

$f(x) = mx + b$
 $y = x$

Domain: _____ Range: _____

Slope = 0

Absolute Value

Domain: _____ Range: _____

slope = undefined

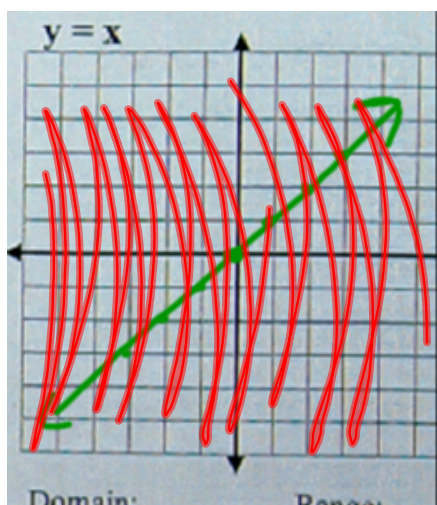
Domain: _____ Range: _____

$y = x$

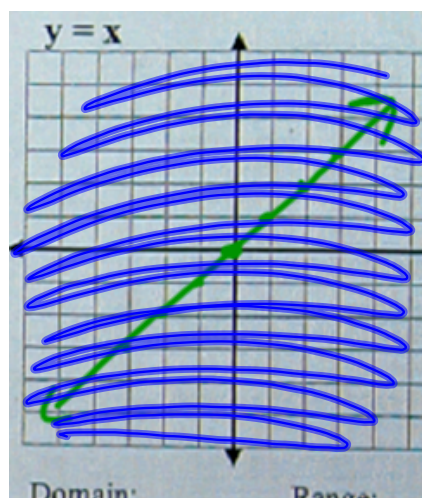
$y = 1x + 0$

\uparrow \uparrow \uparrow

$\frac{y}{1}$ $\frac{x}{1}$ $y\text{-int:}$



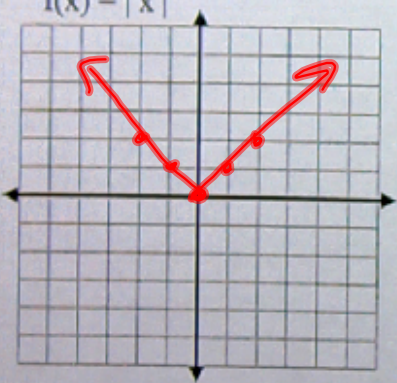
Domain: x-axis
 \mathbb{R} $(-\infty, \infty)$
interval notation



Range:
 \mathbb{R} $(-\infty, \infty)$

Domain: _____ Range: _____ Domain: _____

Absolute Value
 $f(x) = |x|$

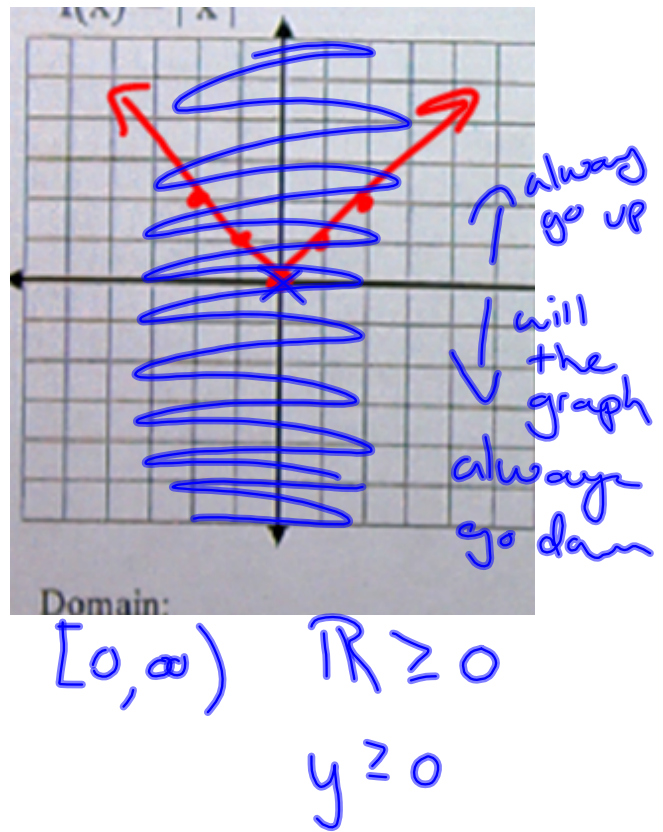
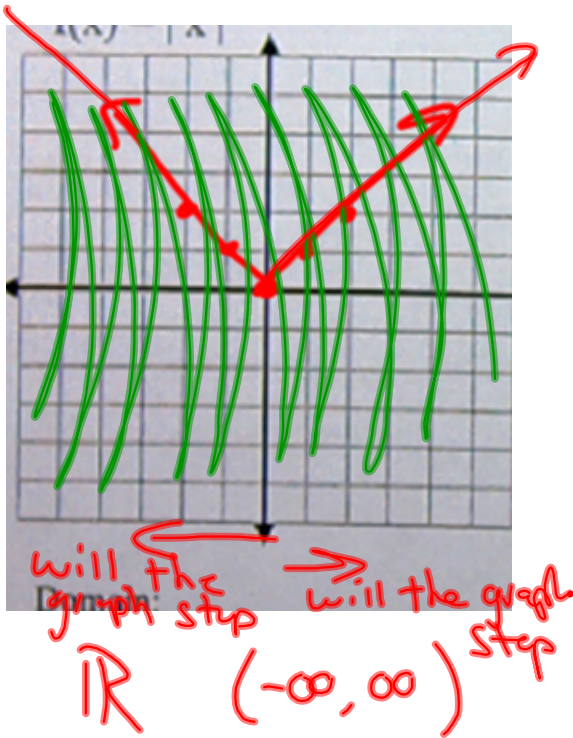


-		

Domain: _____
Range: _____

How to find the Range:

Square Root



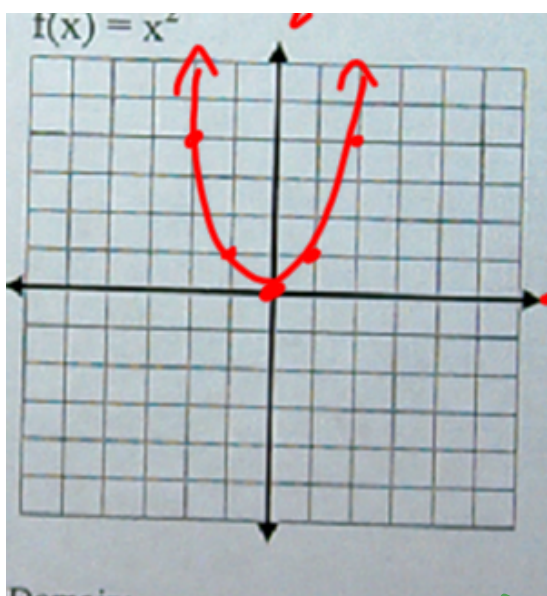
Quadratic
 $f(x) = x^2$

← answer

← plug into equation

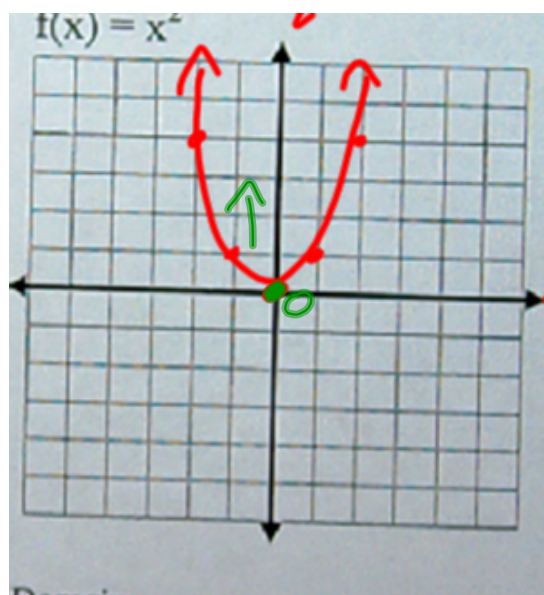
Domain: _____
Range: _____

How to find the Range:
Rational



$\mathbb{R} \quad (-\infty, \infty)$

$-\infty \leq x \leq \infty$

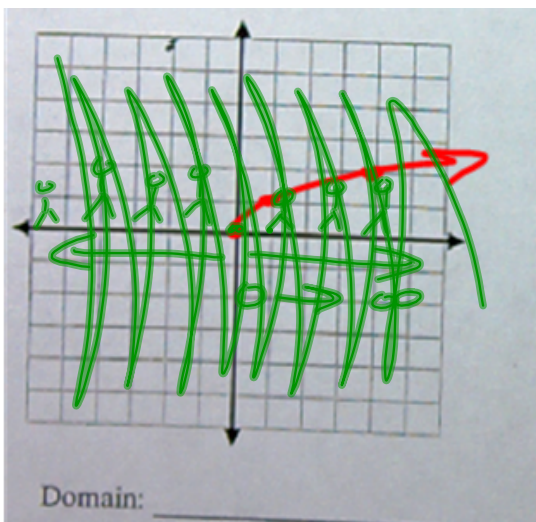


Range: $[0, \infty)$

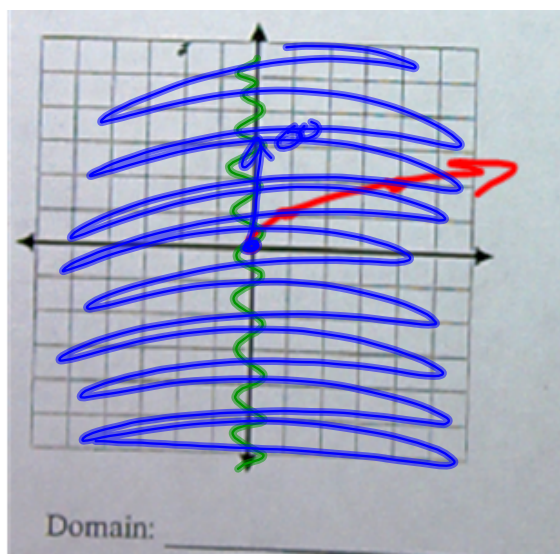
Range: $\mathbb{R} \geq 0$
 $y \geq 0$

Square Root
 $f(x) = \sqrt{x}$

Domain: _____
Range: _____
How to find the Domain:

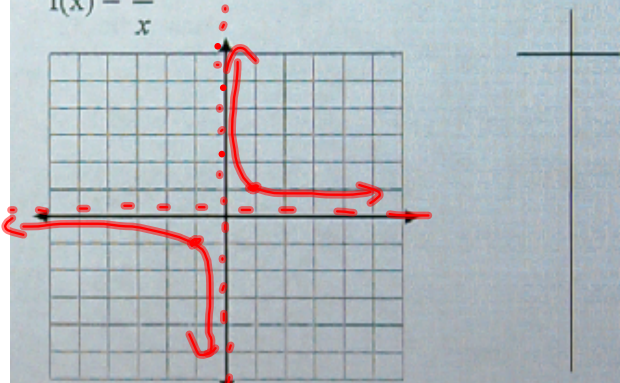


$[0, \infty)$
 $x \geq 0$
 $R \geq 0$



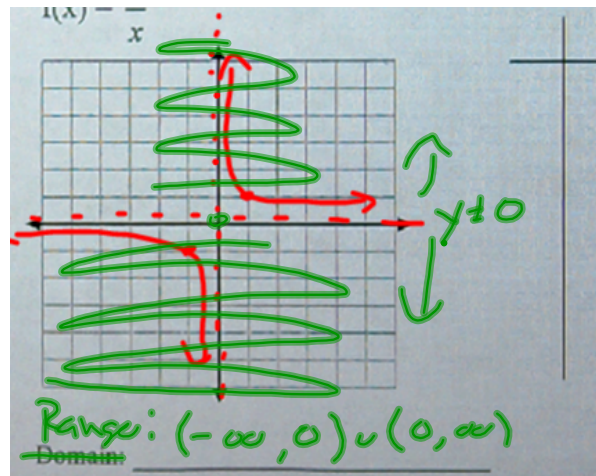
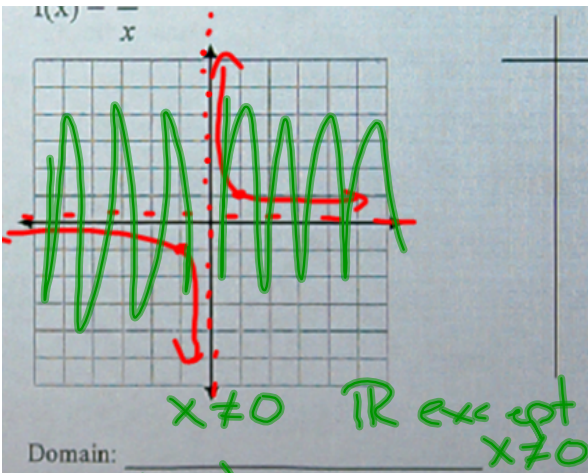
$[0, \infty)$
 $R \geq 0$
 $y \geq 0$

Rational
 $f(x) = \frac{1}{x}$



Domain: _____
Range: _____

How to find the Domain:



$(-\infty, 0) \cup (0, \infty)$
 $\frac{1}{0} = x$
 $0(x) \neq 1$
 $\frac{1}{0} = \text{undefined}$

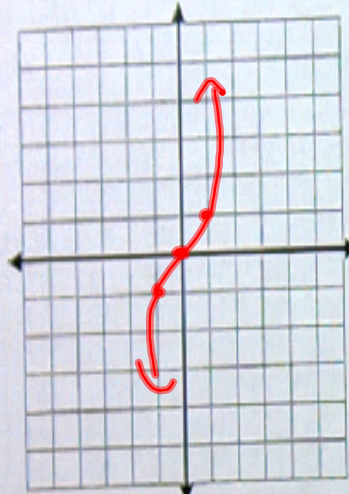
$\frac{10}{2} = 5$

$\frac{10}{x} = 5$

$\frac{10}{4} = 2$

$10 = 5(x)$
 $x = 2$

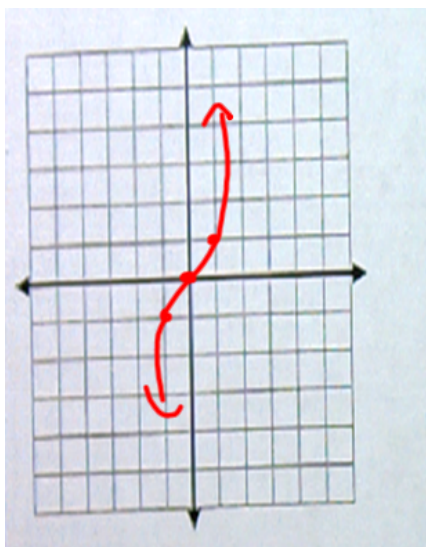
Cubic
 $f(x) = x^3$



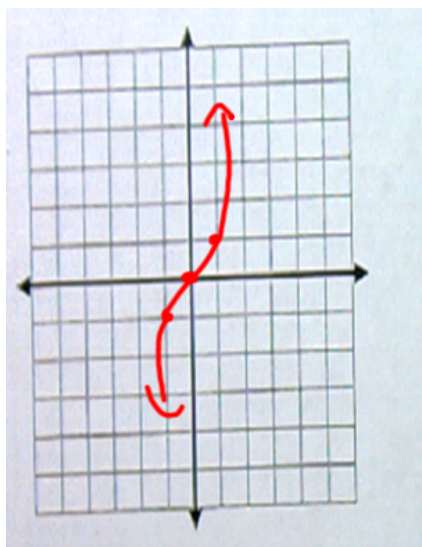
Domain: _____

Range: _____

How to find the Domain:



\mathbb{R}
 $(-\infty, \infty)$



\mathbb{R}
 $(-\infty, \infty)$

List

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

Linear
 cube root

Cubic

D: $(-\infty, \infty)$ quadratic
 R: $[0, \infty)$ absolute

$[0, \infty)$

$[0, \infty)$

Square root
 - rational

rational

$() \cup ()$

$() \cup ()$

Quiz

Scatter plot

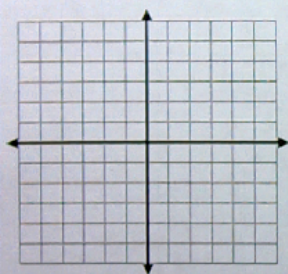
$y = kx$ direct variation

Word problems

$$y = mx + b$$

Cube Root

$$f(x) = \sqrt[3]{x}$$



Domain: _____

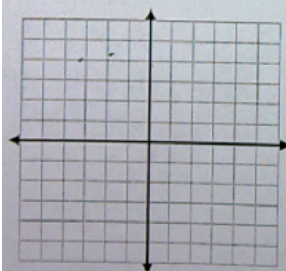
Range: _____

How to find the Domain:

Greatest Integer / Step Function
 $f(x) = \lfloor x \rfloor$

Domain: _____
Range: _____

How to Graph:



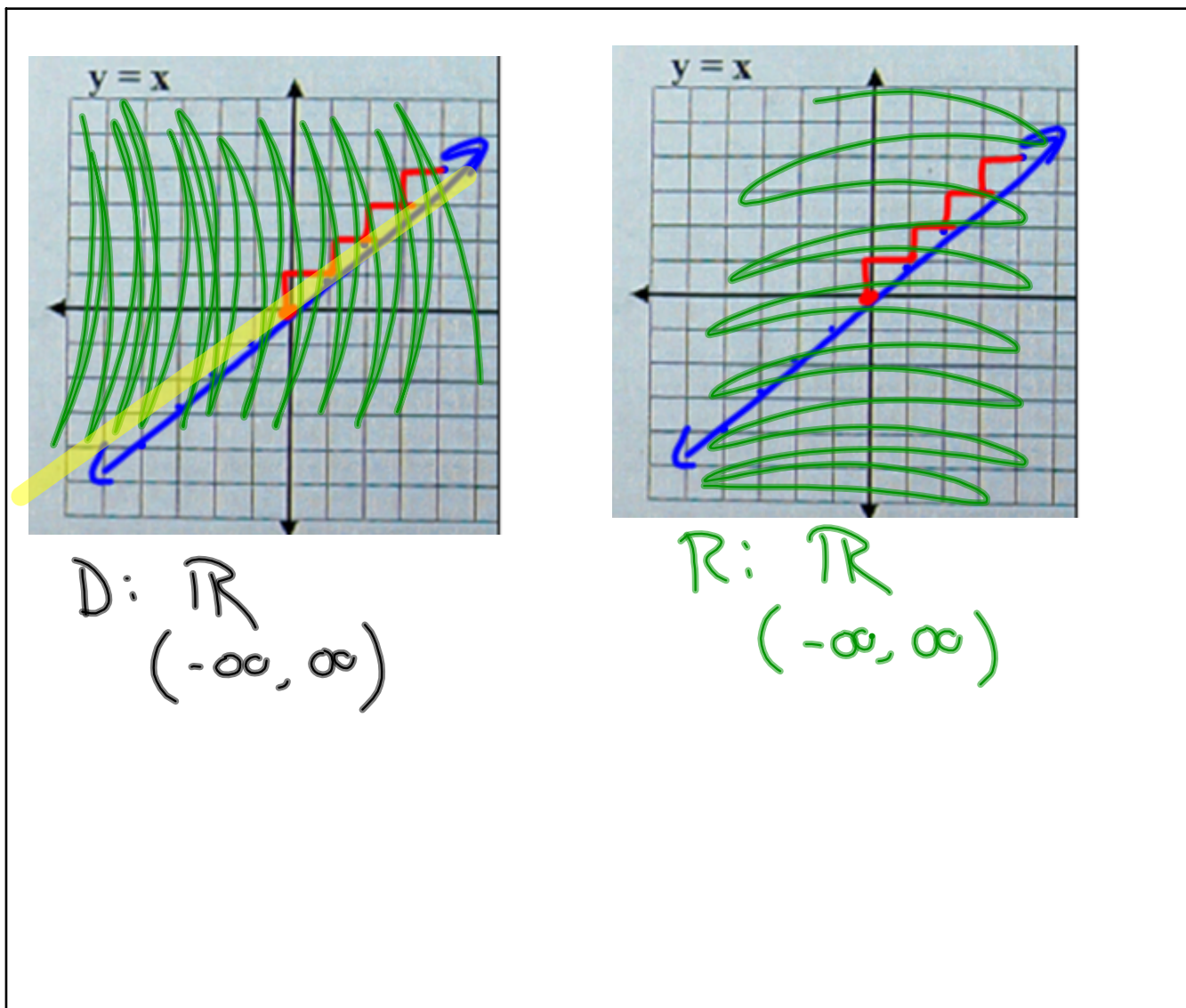
Linear Graphs

$y = 2$ ← Constants → $x = 4$

Domain: $(-\infty, \infty)$ Range: 2 Domain: 4 Range: $(-\infty, \infty)$ Domain: _____ Range: _____

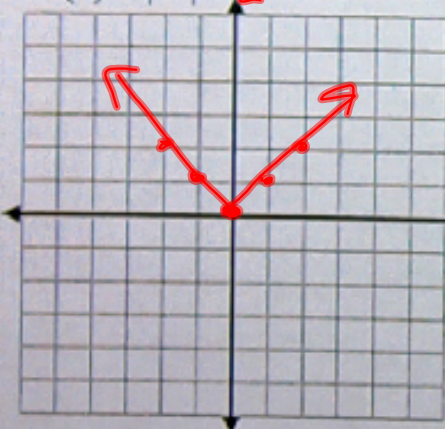
Absolute Value
 Slope = 0 Slope = undefined $y = x$

Slope $\frac{1}{1}$ ↑
 $y = mx + b$
 $y = 1x + 0$ (y-int)
 $y = x$



Domain: _____ Range: _____ Domain: _____

Absolute Value
 $f(x) = |x|$



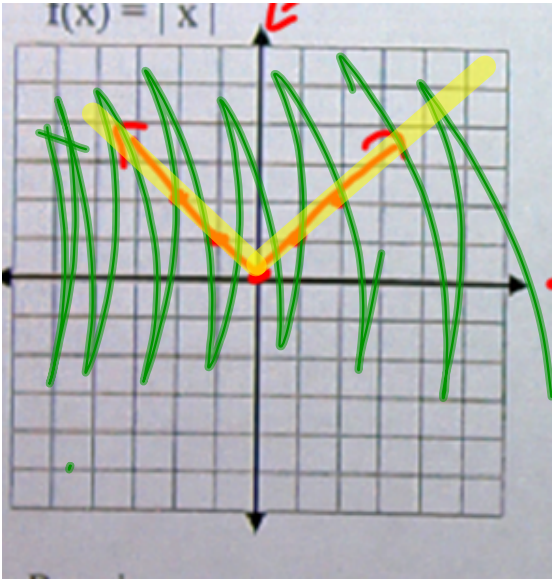
← answer "y"

plug into "x", plug into equation for "x"

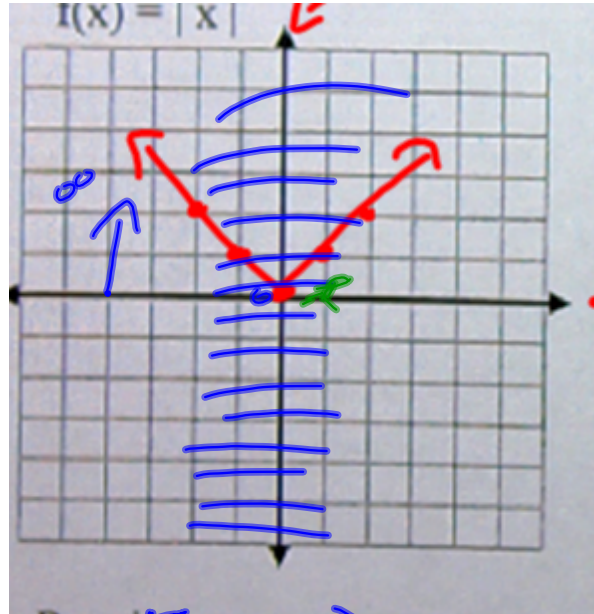
Domain: _____
Range: _____

How to find the Range:

Square Root



\mathbb{R}
 $(-\infty, \infty)$

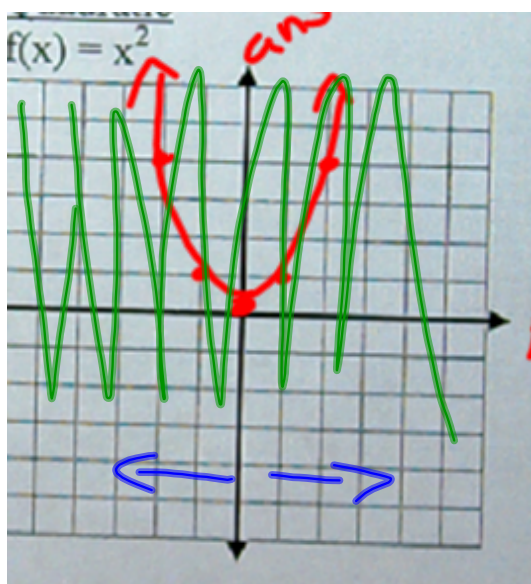


$[0, \infty)$
 $\mathbb{R} \geq 0$
 $y \geq 0$

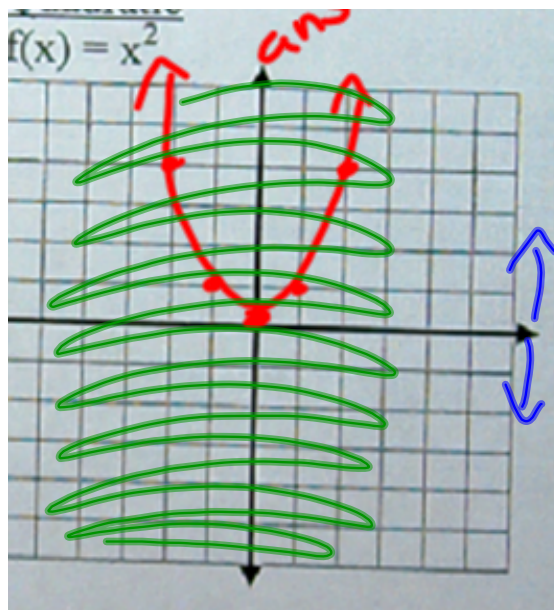
Quadratic
 $f(x) = x^2$

Domain: _____
Range: _____

How to find the Range:
Rational



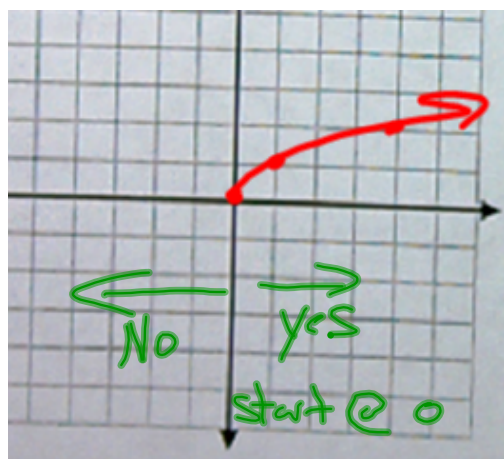
$$\mathbb{R}$$
$$(-\infty, \infty)$$



$$[0, \infty)$$
$$\mathbb{R} \geq 0$$
$$y \geq 0$$

Square Root
 $f(x) = \sqrt{x}$

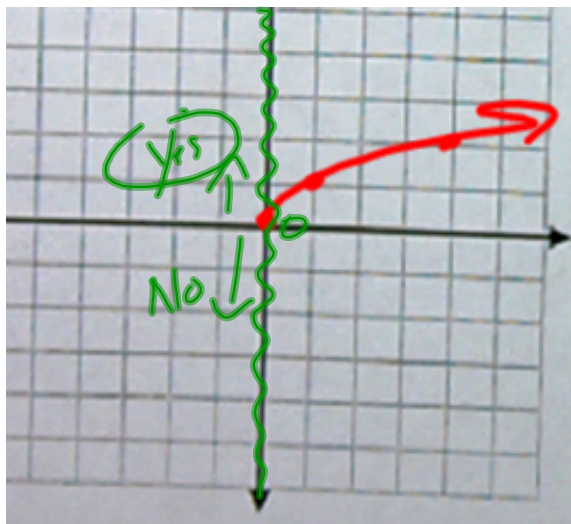
Domain: _____
Range: _____
How to find the Domain: \mathbb{R} $\sqrt{}$



$$[0, \infty)$$

$$\mathbb{R} \geq 0$$

$$x \geq 0$$

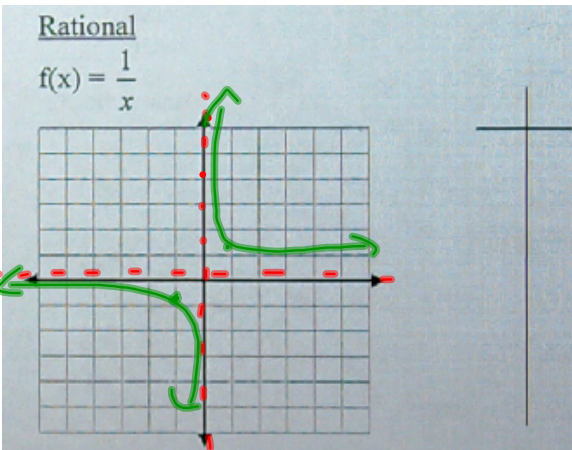


$$[0, \infty)$$

$$\mathbb{R} \geq 0$$

$$y \geq 0$$

Rational
 $f(x) = \frac{1}{x}$



Domain: _____
Range: _____

How to find the Domain:

$\frac{1}{0} = \text{undefined}$

$\frac{10}{5} = 2$

$\frac{8}{2} = 4$

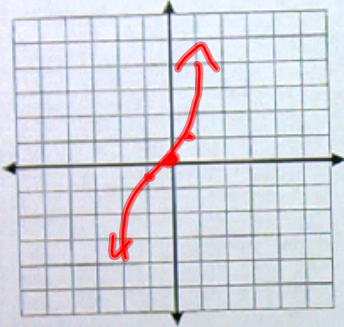
$\frac{1}{0} = ?$ can't happen

Domain: _____
Range: $(-\infty, 0) \cup (0, \infty)$

Domain: _____
Range: $(-\infty, 0) \cup (0, \infty)$

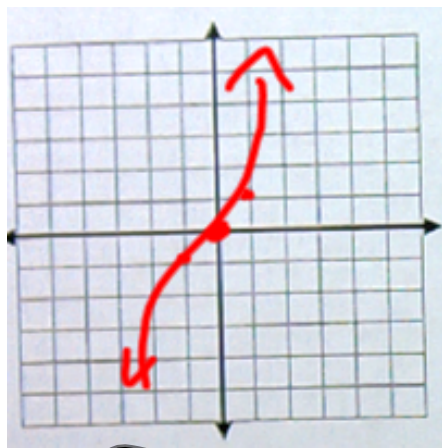
$y = \frac{1}{x} + 2$

Cubic
 $f(x) = x^3$

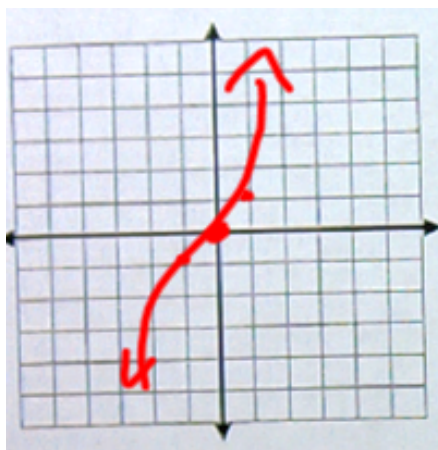


Domain: _____
Range: _____

How to find the Domain:



D: \mathbb{R}
 $(-\infty, \infty)$




R: \mathbb{R}
 $(-\infty, \infty)$

transformation pt.			
$D: (-\infty, \infty)$ $R: (-\infty, \infty)$	$D: [0, \infty)$ $R: [0, \infty)$	$D: (-\infty, \infty)$ $R: [0, \infty)$	$(\quad) \cup (\quad)$ $(\quad) \cup (\quad)$
<p style="color: blue; font-size: 2em;">Cubic</p> <p style="color: green; font-size: 1.5em;">Linear</p>	<p style="color: red; font-size: 2em;">Square Foot</p>	<p style="color: red; font-size: 1.5em;">Quad.</p> <p style="color: green; font-size: 1.5em;">Absolute Value</p> $y = x^2$ $y = (x+2)^2 - 3$ $(-2, -3)$ $D: (-\infty, \infty)$ $R: [-3, \infty)$	<p style="color: blue; font-size: 2em;">Rational</p>

transformation pt.

$D: (-\infty, \infty)$ $R: (-\infty, \infty)$	$D: [0, \infty)$ $R: [0, \infty)$	$D: (-\infty, \infty)$ $R: [0, \infty)$	$() \cup ()$ $() \cup ()$
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<p>Cubic $y = x^3$</p> <p>Linear $y = mx + b$</p>	<p>square root</p> 	<p>quadratic</p> <p>absolute value</p>	<p>rational</p>
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① Scatter plot
 $y = mx + b$
linear reg.

② word problem

③ direct variation
y varies directly
as x
 $y = kx$

