

Calculus Lesson 1

## Review Functions

LINEAR  $y = mx + b$

QUADRATIC  $y = x^2$

CUBIC  $y = x^3$

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

Aug 26-7:59 AM

Function: for each  $x$  there is one only  $y$

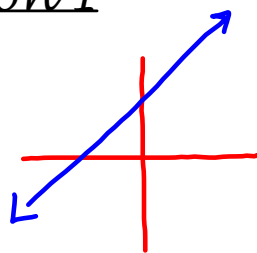
'Passes Vertical Line Test'

- You will only perform analysis with Functions!

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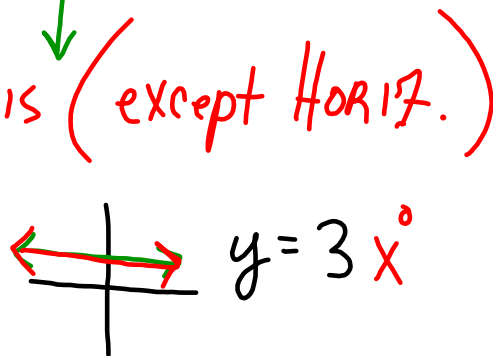
LINEAR



$y = x$

- goes right  $\infty$
- goes left  $\infty$
- intersects x & y axis (except HORIZ.)
- turns never!

only once each

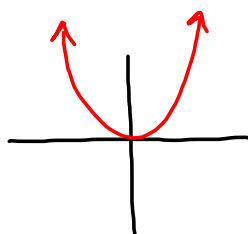


$y = 3x^0$

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Quadratic

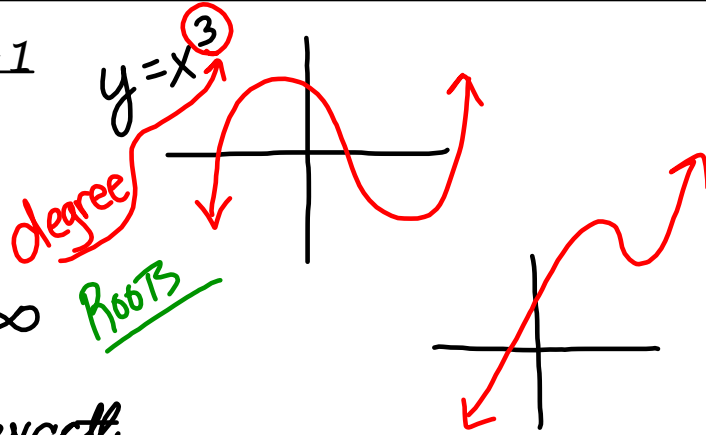


$y = x^2$

- $\leftarrow \infty \rightarrow \infty$
- intersects y-axis once only!
- intersects x-axis ... 0  
... 1  
... 2
- Turns 1 time only
- goes 'up' forever OR  
goes 'down' forever ... NOT both!



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Calculus Lesson 1Cubic

- $\leftarrow \infty \rightarrow \infty$  Roots
- two turns exactly
- intersects x-axis... 1, 2, 3 times!  
"ZEROS"
- $\uparrow \infty \downarrow \infty$
- Starts & Stops in different 'direction'

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degree - 1 = # of turns (could have)

degree = # roots

degree = max # of Zeros

odd degrees  $\rightarrow$  must have Zeros

even degree  $\rightarrow$  NOT!

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- $y = 3x + 4$
- $y = 2x^2 - 3$
- $y = x^3 - 1$

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Root  $\rightarrow$  an  $x$ -value that makes the  $y$ -value equal to Zero.

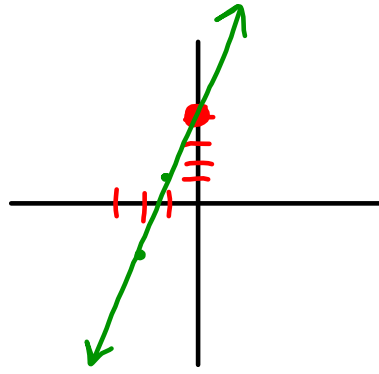
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$$y = 3x + 4$$

$$x\text{-int} = -4/3$$

$$y\text{-int} = 4$$



THE ZERO  
 &  
 ROOT

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$$y = 2x^2 - 3$$

$$0 = 2x^2 - 3$$

$$\frac{3}{2} = \frac{2x^2}{2}$$

$$\pm \sqrt{3/2} = x$$

find Zeros  
 and  
 Roots!

(1 + 2 + 4)

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$$y = x^3 - 1$$

$$0 = x^3 - 1$$

$$+1 \quad +1$$

$$1 = x^3$$

$$\sqrt[3]{1} = x$$

Roots = {1, 1, 1}

OR

Zeros = {1}

intersects @ (1, 0)

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$$y = \frac{x^2 + 1}{3x^3 - 5}$$

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