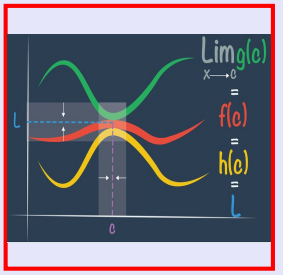
Calculus I

Lecture 2



Feb 19-8:47 AM

Given $f(x) = x^2 + 4x + 4$

Function,

Polynomial function

Quadratic form

$f(x) = ax^2 + bx + c, \; a \neq 0$

Domain $(-\infty, \infty)$

Y-Int $\rightarrow x = 0$

$f(0) = 0^2 + 4(0) + 4 = 4$

$\rightarrow (0, 4)$

x-Int $\rightarrow y = 0$

$f(x) = 0$

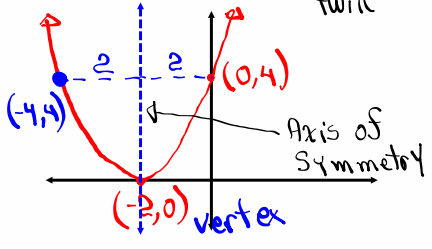
$x^2 + 4x + 4 = 0$

$(x+2)(x+2) = 0$

By Zero-Product Rule

$x + 2 = 0 \quad x = -2$

$\rightarrow (-2, 0)$ Repeated twice



Feb 6-8:48 AM

Given $f(x) = \frac{x^3 - 9x}{x+3}$

Rational Function

Domain where deno. $\neq 0$.

$x + 3 \neq 0$

$x \neq -3$

$(-\infty, -3) \cup (-3, \infty)$

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

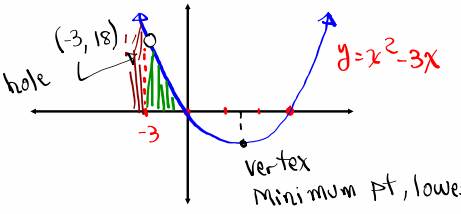
$f(x) = \frac{x(x+3)(x-3)}{x+3}$

$f(x) = x(x-3) = x^2 - 3x$

Y-Int. $\rightarrow f(0) = 0(0-3) = 0 \rightarrow (0,0)$

x-Int $\rightarrow f(x) = 0 \rightarrow x(x-3) = 0 \rightarrow x = 0 \rightarrow (0,0)$

$x = 3 \rightarrow (3,0)$



As $x \rightarrow -3^+ \Rightarrow y \rightarrow 18$

As $x \rightarrow -3^- \Rightarrow y \rightarrow 18$

use your calc to find

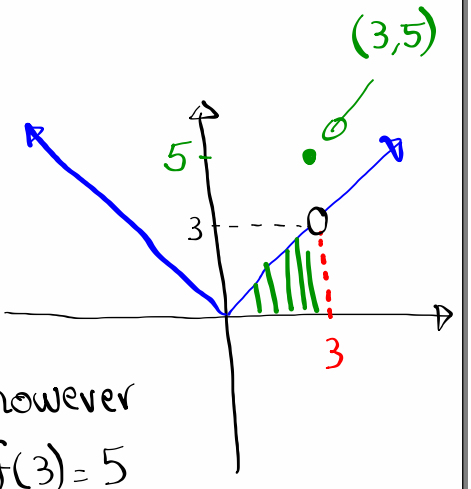
$f(-2.99) = \frac{(-2.99)^3 - 9(-2.99)}{-2.99 + 3}$

≈ 17.9101

Feb 6-8:57 AM

Given

$$f(x) = \begin{cases} |x| & \text{if } x \neq 3 \\ 5 & \text{if } x = 3 \end{cases}$$



as $x \rightarrow 3^+ \Rightarrow y \rightarrow 3$

as $x \rightarrow 3^- \Rightarrow y \rightarrow 3$

however

$f(3) = 5$

Feb 6-9:10 AM

Given $f(x) = \sqrt{x+4} - 1$

No index → index = 2

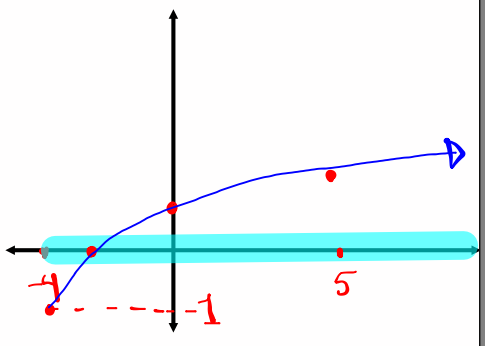
Square-Root function

↳ Radicand ≥ 0

$x + 4 \geq 0$

$x \geq -4$

x	y
-4	-1
-3	0
0	1
5	2



Domain $[-4, \infty)$

Range $[-1, \infty)$

Feb 6-9:15 AM

Class QZ 1

Given $f(x) = x^2 + 2x - 8$

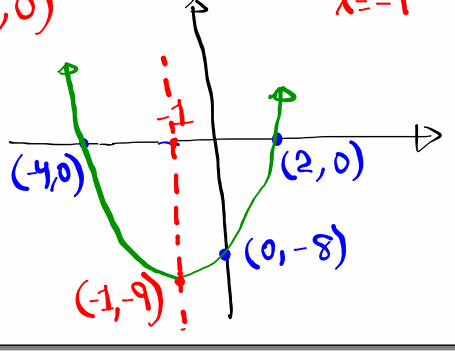
1) Y-Int $f(0) = 0^2 + 2(0) - 8 = -8 \rightarrow (0, -8)$

2) x-Ints $f(x) = 0 \rightarrow x^2 + 2x - 8 = 0 \rightarrow (x+4)(x-2) = 0$

$x = -4 \quad x = 2$

↳ $(-4, 0), (2, 0)$

3) Graph.



Feb 6-9:38 AM