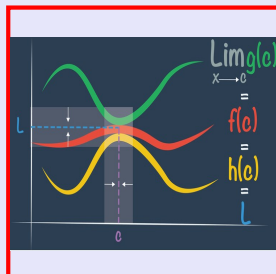


Calculus I

Lecture 1



Suppose

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

$$y = mx + b$$

Slope-Int. Form

Linear Function

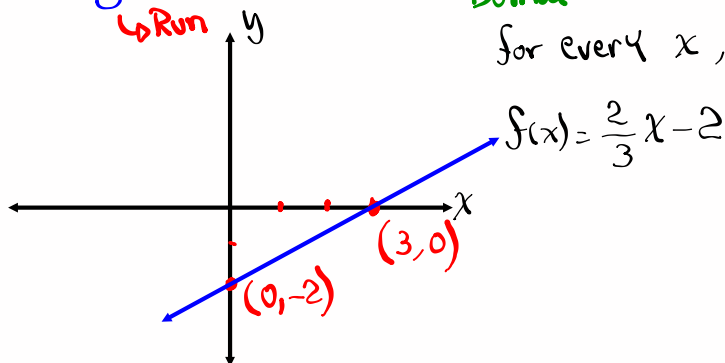
$m = \frac{2}{3}$, Y-Int (0, -2)

Rise
Run

x
Domain

y
Range

For every x , there is only one y .



Given $5x + 2y = 10$

1) Isolate y .

$$2y = -5x + 10$$

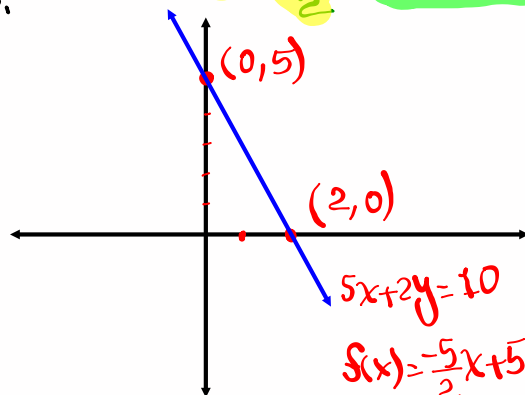
$$y = -\frac{5}{2}x + 5$$

2) Express **function notation**

$$f(x) = -\frac{5}{2}x + 5$$

3) Graph. Provide details.

$$m = -\frac{5}{2}, \text{ y-Int } (0, 5)$$



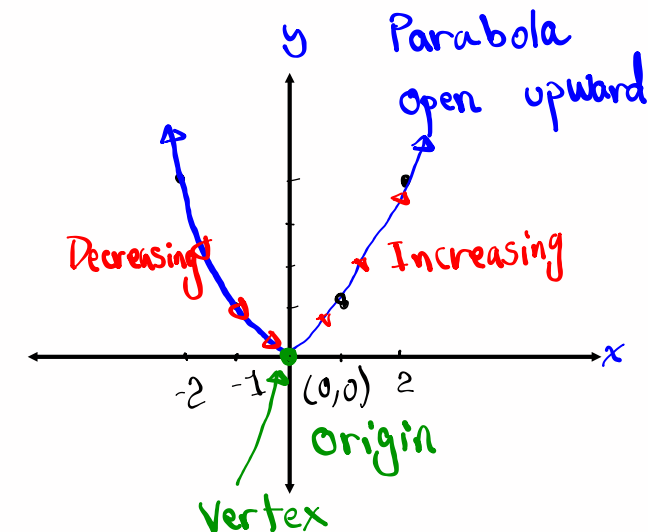
what can you tell me about

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

x	y
0	0
1	1
2	4
-1	1
-2	4

Domain $(-\infty, \infty)$

Range $[0, \infty)$

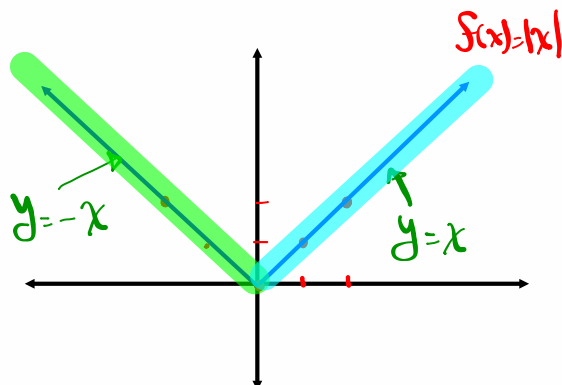


Interval notation

Given $f(x) = |x|$

Absolute value function

x	y
0	0
1	1
2	2
-1	1 ✓
-2	2 ✓



$$f(x) = \begin{cases} -x & \text{if } x < 0 \\ x & \text{if } x \geq 0 \end{cases}$$

Given $f(x) = x^2 - 4x \rightarrow f(x) = a(x-h)^2 + k$
vertex (h, k)

find

1) $f(0) = 0^2 - 4(0) = \boxed{0}$

3) $f(-2) = (-2)^2 - 4(-2)$
 $= 4 + 8 = \boxed{12}$

2) $f(1) = 1^2 - 4(1) = \boxed{-3}$

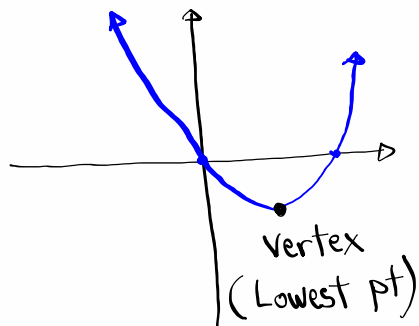
4) all x -values where
 $f(x) = 0$.

$$x^2 - 4x = 0$$

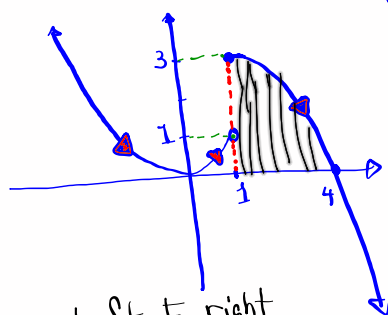
$$x(x - 4) = 0$$

$$\boxed{x=0}$$

$$\boxed{x=4}$$



Consider the graph below



Y-Int. $(0,0)$

X-Ints. $(0,0), (4,0)$

$$f(1) = 3$$

\uparrow \uparrow
 x y

From Left to right

Increasing
 $(0, 1)$

Decreasing
 $(-\infty, 0) \cup (1, \infty)$
Union

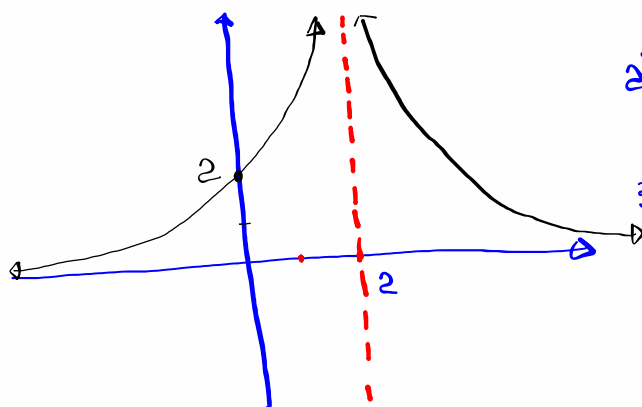
as $x \rightarrow 1$ From left Side $\Rightarrow y \rightarrow 1$

as $x \rightarrow 1$ From right Side $\Rightarrow y \rightarrow 3$

$x \rightarrow 1^-$, $y \rightarrow 1$

$x \rightarrow 1^+$, $y \rightarrow 3$

Consider the graph below:



1) Y-Int $(0,2)$

2) X-Int None

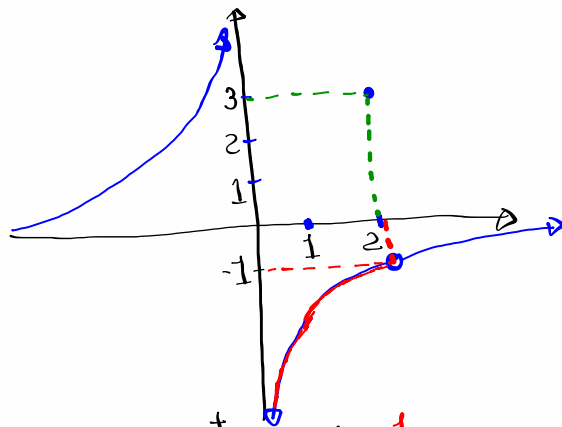
3) what is the name
of the dotted line?

Vertical
Asymptote

4) As $x \rightarrow 2^+$, $y \rightarrow \infty$

5) As $x \rightarrow 2^-$, $y \rightarrow \infty$

Consider the graph below



1) y -Int **None**

2) x -Int **None**

3) As $x \rightarrow 0^-$, $y \rightarrow \infty$

4) As $x \rightarrow 0^+$, $y \rightarrow -\infty$

5) as $x \rightarrow 2^+$, $y \rightarrow -1$

6) as $x \rightarrow 2^-$, $y \rightarrow 3$

7) What is the function value at $x=2$? **3**

$$f(2) = 3$$