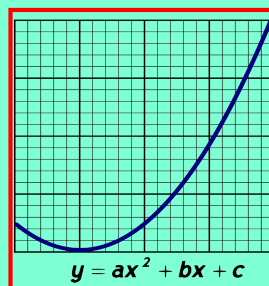


Math 125
Fall 2021
Lecture 53



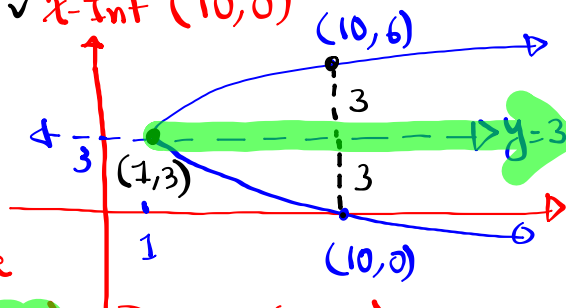
Class QZ 42
Graph $x = a(y-k)^2 + h$
 $x = (y-3)^2 + 1$

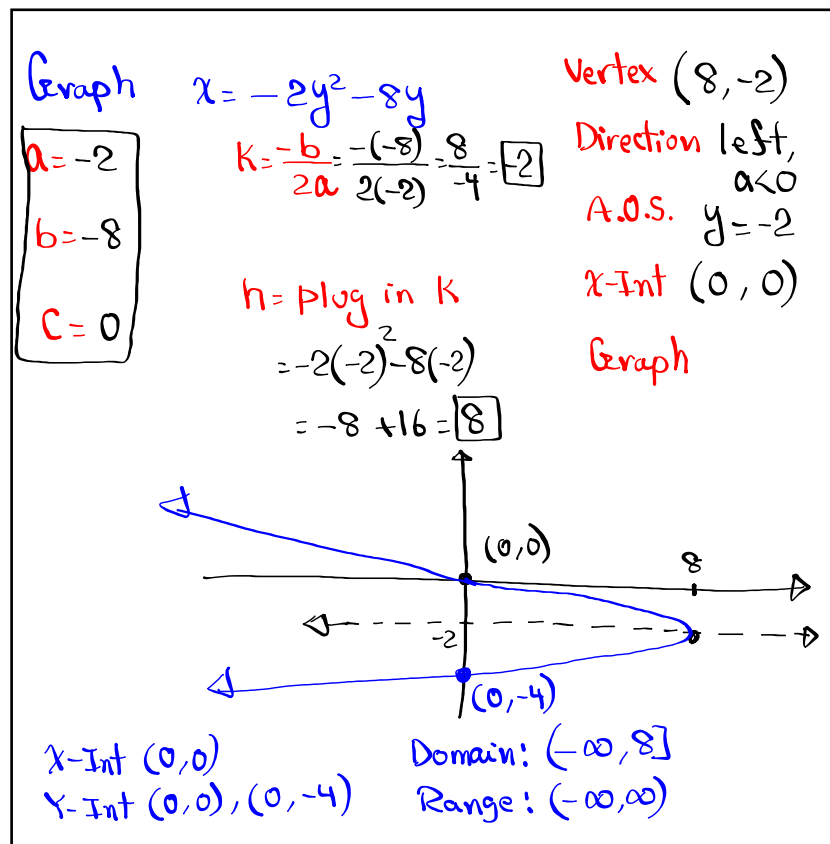
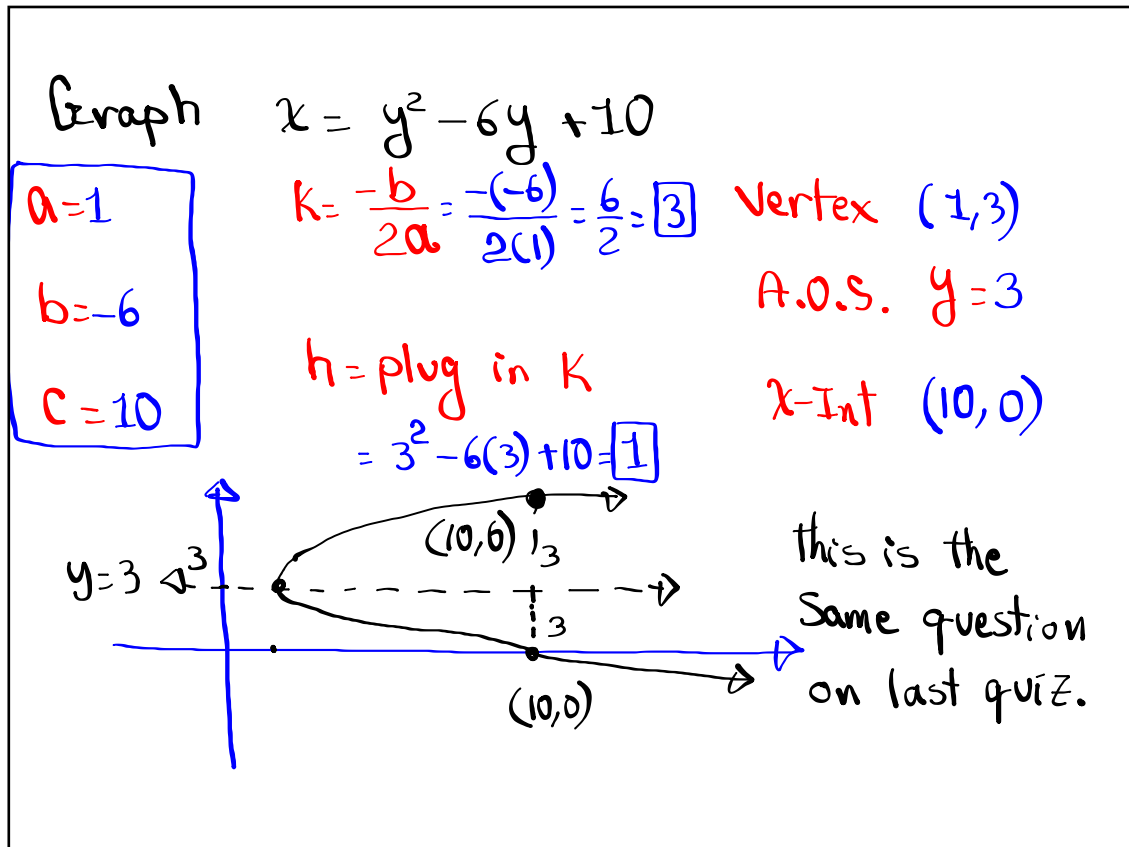
Give all details.

label all important
information on the
graph. ✓ Y-Int None

Domain: $[1, \infty)$, Range: $(-\infty, \infty)$

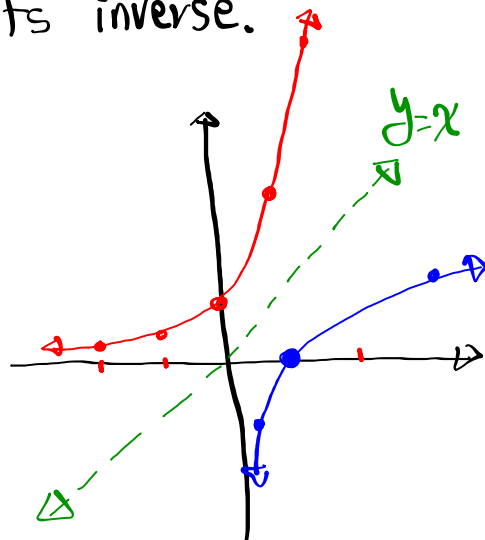
$a=1$ ✓ $h=1$ ✓ $k=3$ ✓
✓ Vertex $(1, 3)$, opens ✓ right
A.O.S. $y=3$ ✓
✓ x-Int $(10, 0)$



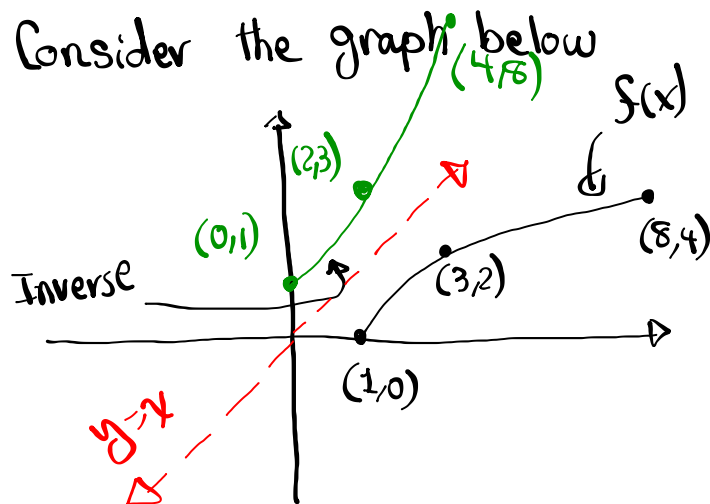


Graph $f(x) = 4^x$ and its inverse.

x	y	x	y
0	1	-1	$4^{-1} = \frac{1}{4}$
1	4	-2	$4^{-2} = \frac{1}{16}$
2	16		



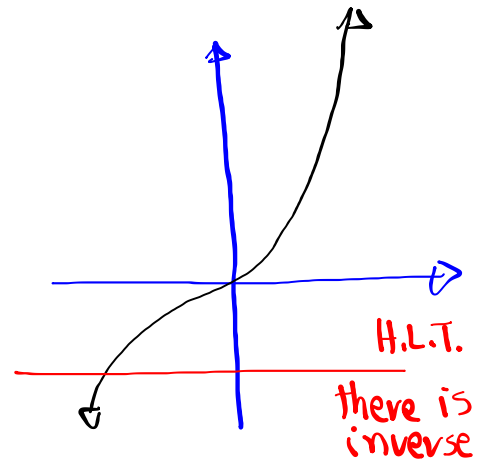
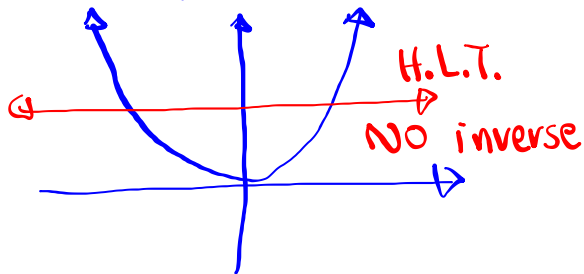
Consider the graph below



	Domain	Range
$f(x)$	$[1, 8]$	$[0, 4]$
Inverse	$[0, 4]$	$[1, 8]$

Only increasing OR decreasing functions have inverse.

We can use horizontal line test to verify.



$f(x)$ Function

$f^{-1}(x)$ "F inverse of x"

How to find $f^{-1}(x)$:

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

$$y = 2x - 3$$

$$x = 2y - 3$$

$$x + 3 = 2y$$

$$\frac{x + 3}{2} = y$$

1) Replace $f(x)$ with y .

2) Switch x & y .

3) Solve for y

4) Replace y with $f^{-1}(x)$

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

find $f^{-1}(x)$ for $f(x) = 3x + 5$

$$y = 3x + 5$$

$$x = 3y + 5$$

$$x - 5 = 3y$$

$$\frac{x-5}{3} = y \Rightarrow \boxed{f^{-1}(x) = \frac{x-5}{3}}$$

find $f^{-1}(x)$ for $f(x) = \sqrt{x-3}$

Radicand $x-3 \geq 0$

$$x \geq 3$$

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

$$y = \sqrt{x-3}$$

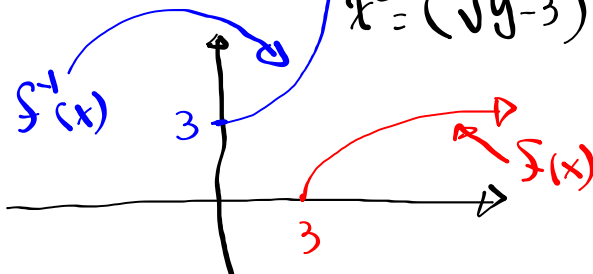
$$x = \sqrt{y-3}$$

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

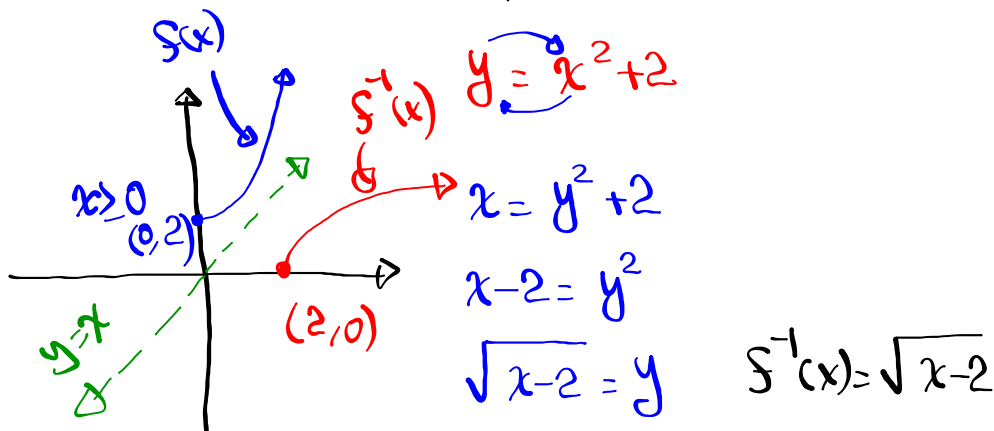
$$x^2 = y - 3$$

$$x^2 + 3 = y$$

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



find $f^{-1}(x)$ for $f(x) = x^2 + 2$. $x \geq 0$



find $f^{-1}(x)$ for $f(x) = \frac{1}{2}x - 3$.

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

$$x = \frac{1}{2}y - 3 \quad \text{multiply by LCD} = 2$$

$$2x = y - 6$$

$$2x + 6 = y$$

$$\rightarrow \boxed{f^{-1}(x) = 2x + 6}$$

Class QZ 43

$$x = -y^2 + 6y - 9$$

Graph $\hat{=}$ give
all details.

Mark important
information on
the graph.

$$a = -1 \quad b = 6 \quad c = -9$$

opens left

$$k = \frac{-b}{2a} = \frac{-6}{2(-1)} = \frac{-6}{-2} = 3$$

$$h = -(3)^2 + 6(3) - 9 = -9 + 18 - 9 = 0$$

Vertex $(0, 3)$

A.O.S. $y = 3$

x-Int $(-9, 0)$ y-Int $(0, 3)$

