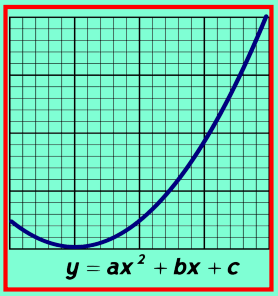
Math 125

Fall 2021

Lecture 52



Class QZ 41

Given $5x^2 - 3x + 10 = 0$

1) Give the value of its discriminant.

$a = 5$

$b = -3$

$c = 10$

$b^2 - 4ac = (-3)^2 - 4(5)(10) = 9 - 200 = -191$

2) Discuss the type of Solutions without Solving.

$b^2 - 4ac < 0 \Rightarrow$ Two imaginary Solutions

Given $(5x-6)(x+1)=10$

1) write in $ax^2+bx+c=0$ form

$5x^2+5x-6x-6-10=0$

$\boxed{5x^2-x-16=0}$

2) find the value of its discriminant

$a=5$, $b=-1$, $c=-16$

$b^2-4ac=(-1)^2-4(5)(-16)=1+320=\boxed{321}$

3) Discuss the type of Solutions

$b^2-4ac>0 \Rightarrow$ Two real Solutions

4) Solve

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{-(-1)\pm\sqrt{321}}{2(5)}=\frac{1\pm\sqrt{321}}{10}$$

$$\left\{\frac{1\pm\sqrt{321}}{10}\right\}$$

Find a quadratic eqn in $ax^2+bx+c=0$ with one repeated Solution of $\frac{2}{5}$.

$\frac{2}{5}$ & $\frac{2}{5}$

$x=\frac{2}{5}$ $\quad$ $x=\frac{2}{5}$

$5x=2$ $\quad$ $5x=2$

$5x-2=0$ $\quad$ $5x-2=0$

$(5x-2)(5x-2)=0$

$25x^2-10x-10x+4=0$

$\boxed{25x^2-20x+4=0}$

$a=25$, $b=-20$, $c=4$

$\Rightarrow b^2-4ac=(-20)^2-4(25)(4)=400-400=\boxed{0}$

$b^2-4ac=0 \Rightarrow$ one repeated real Solution

Graph $x = (y-2)^2 + 2$

$x = a(y-k)^2 + h$

$a = 1$ opens right

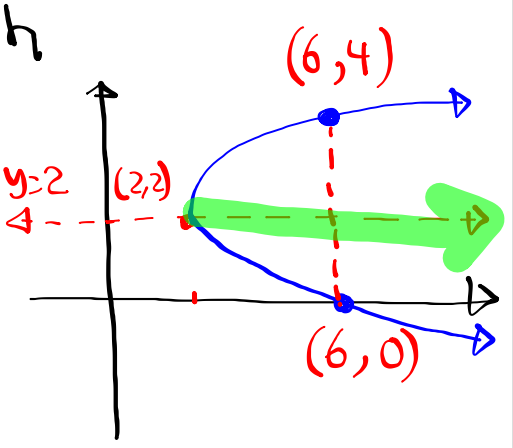
$h = 2$ vertex $(2,2)$

$k = 2$ A.O.S. $y = 2$

x-Int $(6,0)$

Y-Int None

Domain $[2,\infty)$



Range $(-\infty,\infty)$

Given $x = -\frac{1}{2}(y+2)^2$

$a = -\frac{1}{2}$

$h = 0$

$k = -2$

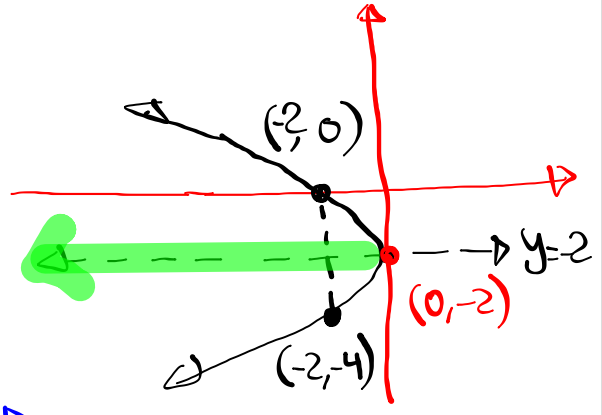
Direction opens left

Vertex $(0,-2)$

A.O.S. $y = -2$

x-Int $(-2,0)$

Y-Int $(0,-2)$



Domain $(-\infty,0]$

Range $(-\infty,\infty)$

$x = ay^2 + by + c$

$a>0$, $a<0$

$k = \frac{-b}{2a}$

h = plug in k, Simplify

$x = y^2 - 4y$

$a=1 \quad b=-4 \quad c=0$

Opens Right

$k = \frac{-b}{2a} = \frac{-(-4)}{2(1)} = \frac{4}{2} = \boxed{2}$

$h = 2^2 - 4(2) = \boxed{-4}$

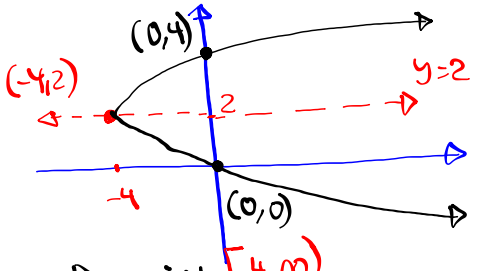
Vertex $(-4, 2)$

A.O.S. $y=2$

opens Right

x-Int $(0, 0)$

Y-Int $(0,0)$, $(0,4)$



Domain: $[-4, \infty)$

Range: $(-\infty, \infty)$

Given $x = -y^2 - 6y$

$a=-1$ opens left

$b=-6$

$c=0$

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

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

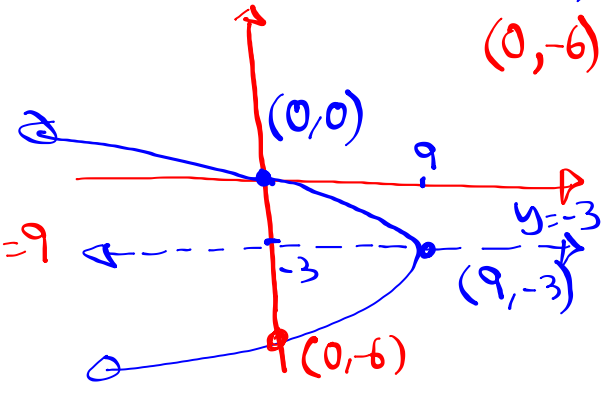
Vertex $(9, -3)$

A.O.S. $y=-3$

x-Int $(0,0)$

Y-Int $(0,0)$

$(0,-6)$



Domain $(-\infty, 9]$

Range $(-\infty, \infty)$

Graph $x = y^2 - 8y + 10$

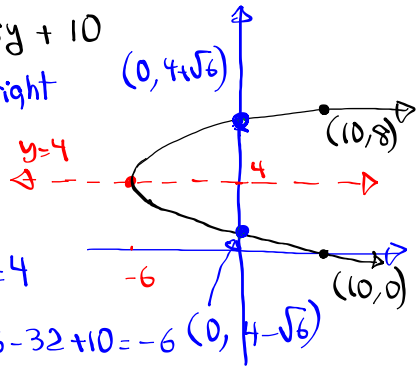
$a = 1$ Opens right

$b = -8$

$c = 10$

$k = \frac{-b}{2a} = \frac{-(-8)}{2(1)} = \frac{8}{2} = 4$

$h = 4^2 - 8(4) + 10 = 16 - 32 + 10 = -6$



Vertex $(-6, 4)$

A.O.S. $y = 4$

Y-Int $x = 0$

$y^2 - 8y + 10 = 0$

x-Int $(10, 0)$

$y^2 - 8y = -10$

$y^2 - 8y + 16 = -10 + 16$

$(y-4)^2 = 6$

$y - 4 = \pm\sqrt{6}$

$y = 4 \pm \sqrt{6}$

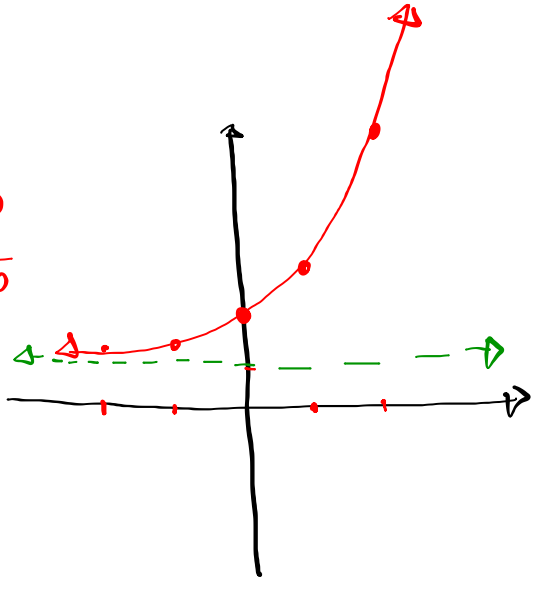
Domain $[-6, \infty)$

Range $(-\infty, \infty)$

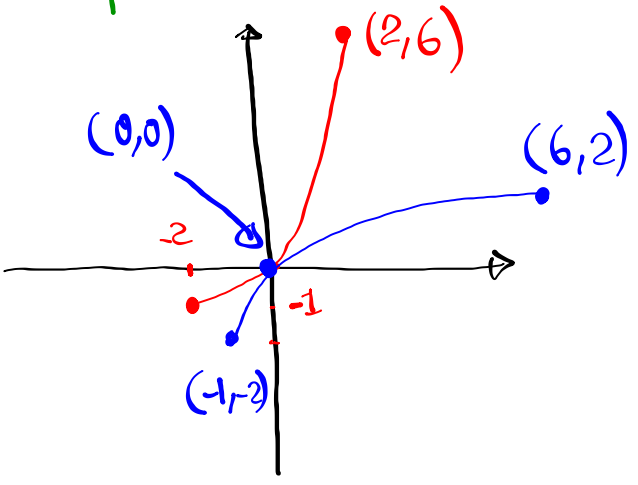
$f(x) = 2^x + 1$

x	y
0	2
1	3
2	5

x	y
-1	$\frac{1}{2} + 1 = 1.5$
-2	$\frac{1}{4} + 1 = 1.25$



Graph the inverse of the graph below:



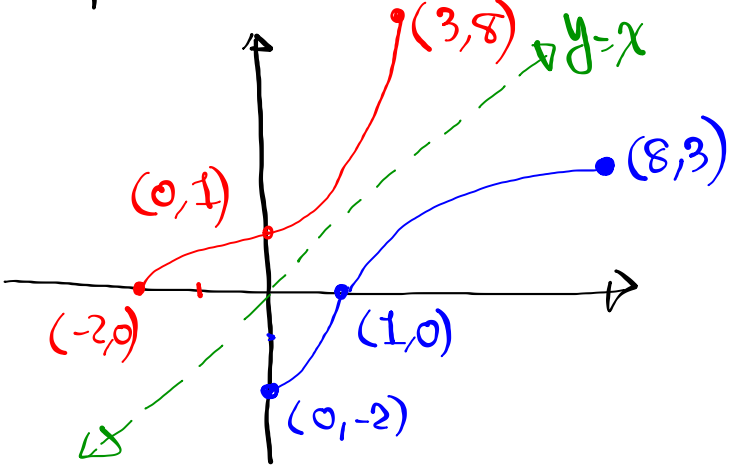
Switch all points

$(-2,-1) \rightarrow (-1,-2)$

$(0,0) \rightarrow (0,0)$

$(2,6) \rightarrow (6,2)$

Graph the inverse of the graph below:



Class QZ 42

Graph $x=(y-3)^2+1$

Give all details.

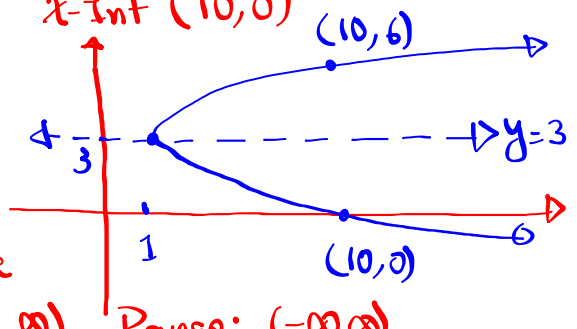
label all important information on the graph.

$a=1$ $h=1$ $k=3$

Vertex $(1,3)$, opens right

A.O.S. $y=3$

x-Int $(10,0)$



Y-Int None

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