11/14/12 - Sec 11.1 Math 1010

#30 $x = -\frac{1}{2}y^2 - 4y - 6$ (Left / Right)

$x = a(y-k)^2 + h$ Vertex: $(2, -4)$ ✓

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

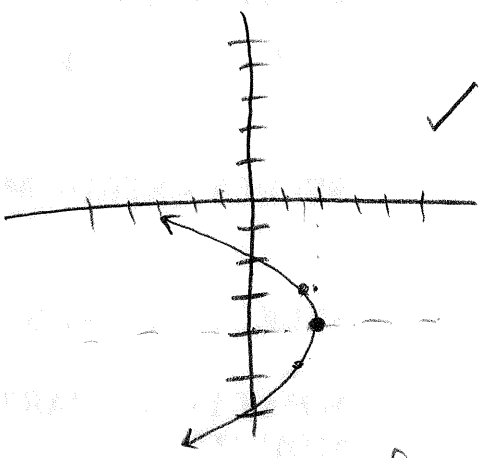
$= \frac{-(-4)}{2(-\frac{1}{2})} = \frac{4}{-1} = -4$

$x = -\frac{1}{2}(-4)^2 - 4(-4) - 6$

$= -\frac{1}{2} \cdot 16^8 + 16 - 6$

$= -8 + 16 - 6$

$= 8 - 6 = 2$



x	y
2	-4
1.5	-3
1.5	-5

axis of symmetry: $y = -4$

Domain: $(-\infty, 2]$

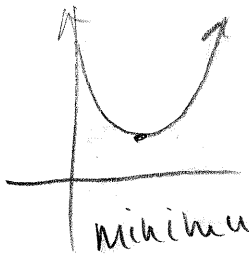
Range: $(-\infty, \infty)$

#42 $C(x)$ ← is units

$C(x) = x^2 - 70x + 1500$

cost; $a = 1$, $b = -70$, $c = 1500$

$x = \frac{-b}{2a} = \frac{-(-70)}{2(1)} = \frac{70}{2} = 35$



35 units

minimum cost: $C(35)$

$= \$275$

$(35)^2 - 70(35) + 1500$

#45

$a = -20,57$ $\quad b = 758.9$

$$f(x) = -20,57x^2 + 758.9x - 3140$$

Note: $x = 10 \rightarrow 2010$

$x = 15 \rightarrow 2015$

$f(x)$ in Billions of $

$$X = \frac{-b}{2a} = \frac{-758.9}{2(-20,57)} = 18.45$$

$(18.45, 3860.)$

$$f(18.45) = -20,57(18.45)^2 + 758.9(18.45) - 3140 =$$

$\approx$ 2018 the Social Security Assets would be $\approx \$3860$ billion

Sec 11.1 Additional Graphs of Functions

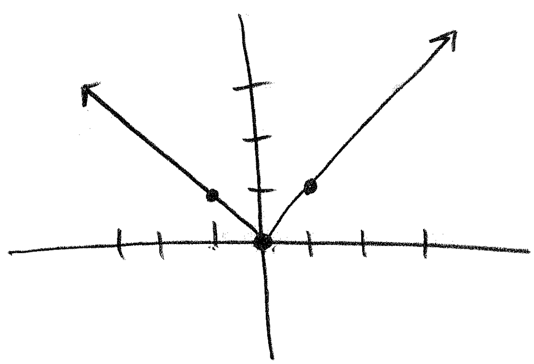
Recall Parabola

$$f(x) = a(x-h)^2 + K$$

- a ← stretch
- h ← left/right
- K ← up/down
- exponent 2 ← tells us parent function is parabola

The Absolute Value Function

$f(x) = |x|$



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

Range: $[0, \infty)$

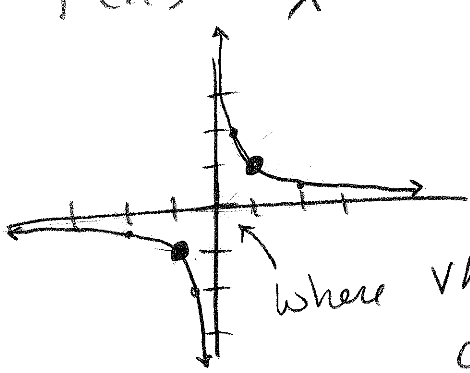
x	y
0	0
1	1
-1	1

The Reciprocal Function

$f(x) = \frac{1}{x}$

VA: $x=0$

HA: $y=0$



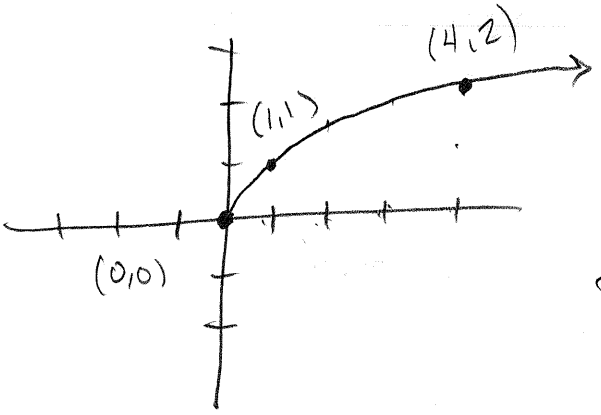
Domain: $\{x \mid x \neq 0\}$
$(-\infty, 0) \cup (0, \infty)$

Range: $\{y \mid y \neq 0\}$
$(-\infty, 0) \cup (0, \infty)$

x	y
0	undefined
1	1
2	$\frac{1}{2}$
$\frac{1}{2}$	$\frac{1}{\frac{1}{2}} = 1 \cdot \frac{2}{1} = 2$
-1	-1
-2	$-\frac{1}{2}$
$-\frac{1}{2}$	-2

The Square Root Function

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



Domain: $[0, \infty)$

Range: $[0, \infty)$

x	y
0	0
1	1
-1	Not Real
4	2

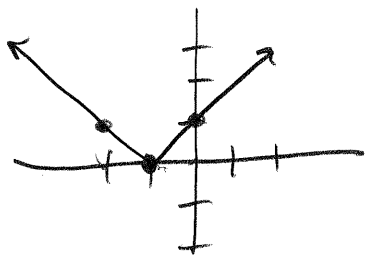
Moving Parent functions

Remember

1. Number outside parent function moves up/down
2. Number inside parent function with x moves left/Right (always opposite sign)

#11 $f(x) = |x + 1|$ ← parent Absolute Value V

$+1$ ← -1



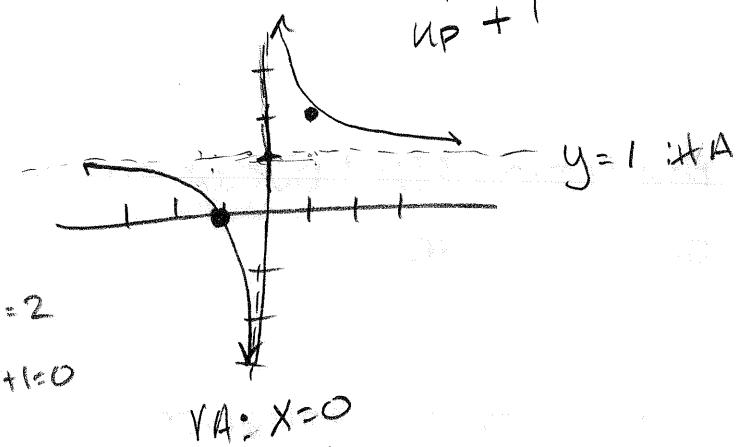
Domain: $(-\infty, \infty)$

Range: $[0, \infty)$

#13 $f(x) = \frac{1}{x} + 1$

↑ up +1

Reciprocal



x	y
1	$\frac{1}{1}+1=1+1=2$
-1	$\frac{1}{-1}+1=-1+1=0$

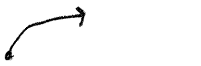
Domain: $\{x \mid x \neq 0\}$

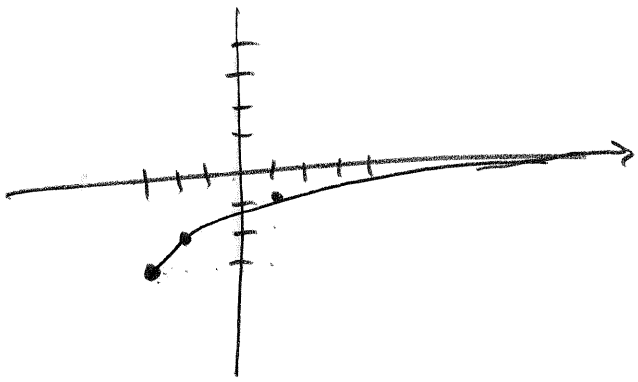
Range: $\{y \mid y \neq 1\}$

#19 $f(x) = \sqrt{x+3} - 3$

← -3 ↓ -3

Square Root





x	
-3	-3
-2	-2
-4	undefined
1	-2

Domain: $[-3, \infty)$

Range: $[-3, \infty)$