8/24/2012 - Sec P.2/P.3

Math 1060

Equation of a circle

Standard form: $(x-h)^2+(y-k)^2=r^2$

Center: $(2,-1)$ $\quad r=4$

$$(x-2)^2+(y--1)^2=4^2$$

$$(x-2)^2+(y+1)^2=16$$

center at origin $(0,0)$

Radius $=1$

$$(x-0)^2+(y-0)^2=1^2$$

$$x^2+y^2=1 \leftarrow \text{unit circle}$$

Lines

Defn: A <u>Linear Equation</u> in x and y is any equation of the form

$$Ax+By=C$$

Ex: $x=5-y$, $y=\frac{1}{2}x-9$

$x=4$, $y=5$

P2 Functions

Defn: If the value of a variable y is determined by the value of another variable x, then

y is a function of x

y: dependent variable

x: independent variable

Examples:

$$A = \pi r^2$$

Graphing Functions

set of x inputs $\Rightarrow$ domain

set of y outputs $\Rightarrow$ Range

Graph by plotting points

Visual test for functions:

Vertical Line Test

Function Notation

If y is a function of x, we may give the Relationship a name, example f, and use $f(x)$ instead of y

Ex: $f(x) = \sqrt{2x+9}$

$f(2) = \sqrt{2(2)+9}$

$f(2) = \sqrt{4+9}$

$= \sqrt{13}$

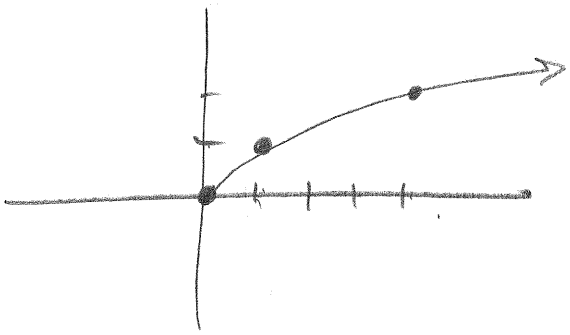
P3 Families of Functions, Transformations Symmetry

type of transformations

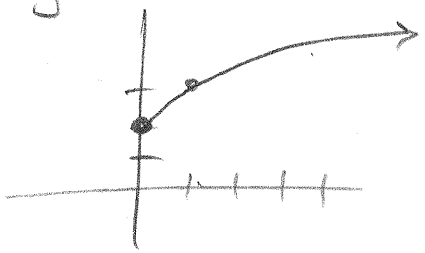
- translating
- Reflecting
- stretching
- shrinking

our "parent" function

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



$y = \sqrt{x} + 2$ ↑



$y = f(x) + k$

↑

shifts vertically k units

$y = \sqrt{x+1}$

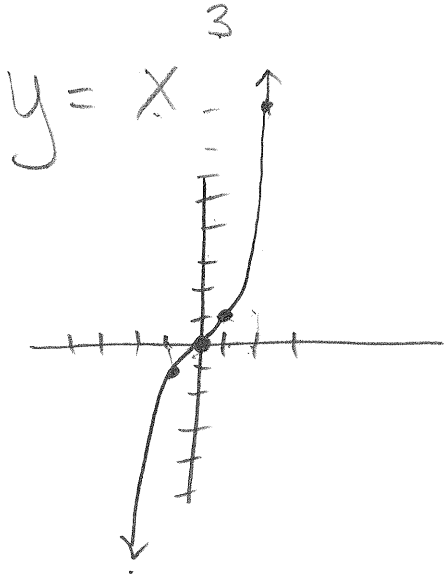
← 1 unit

$y = f(x-h)$

↑

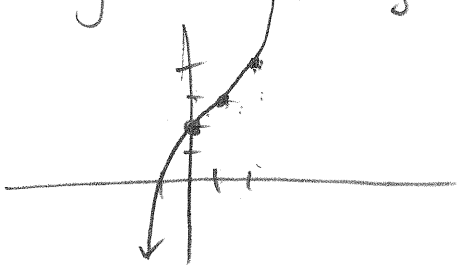
shift horizontally opposite direction of sign

$y = x^3$

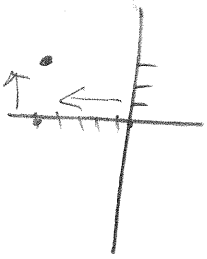


graph $y = (x-1)^3 + 3$

→ 1 ↑ 3



→ $y = |x|$ is shifted left 5 and up 3



$$y = |x + 5| + 3$$

Reflection

$y = \sqrt{x}$

$y = -\sqrt{x}$

$y = -f(x)$

Reflects over x-axis

$y = f(-x)$

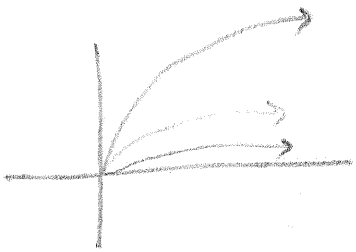
Reflects over y-axis

Stretching Shrinking

$y = \sqrt{x}$

$y = 5\sqrt{x}$

$y = \frac{1}{5}\sqrt{x}$



$y = a f(x)$

if $a > 1$ stretch

if $0 < a < 1$ Shrink

$f(x) = x^2$

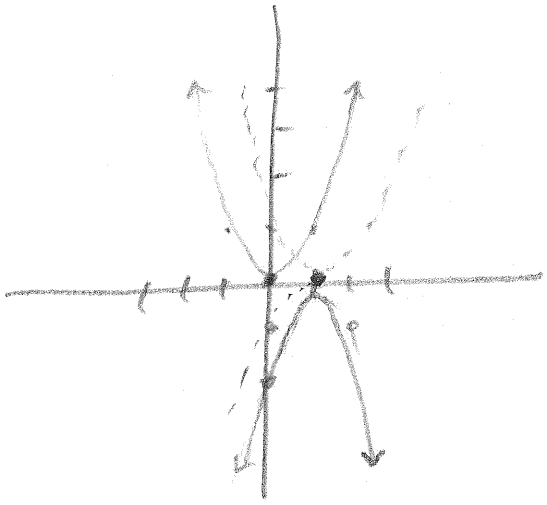
$g(x) = -2(x \underset{\rightarrow}{+1})^2 + 4$

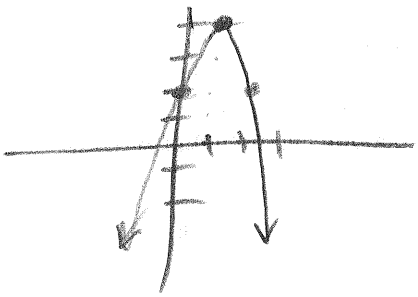
↑ 4 units

→ 1 unit

flip upside down

stretch by 2



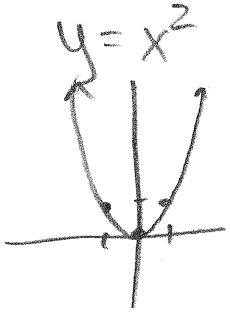


Symmetry

2 kinds for our purposes

1. y-axis symmetry

if $f(-x) = f(x)$



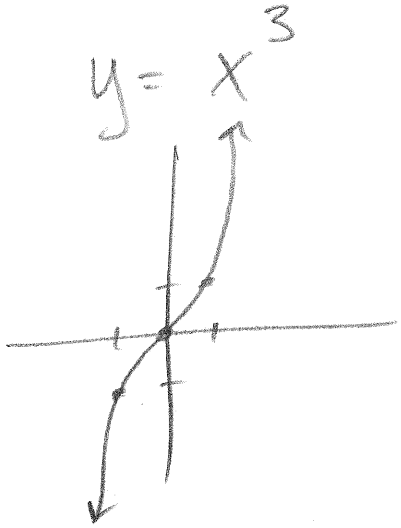
$f(-1) = (-1)^2 = 1$

$f(1) = (1)^2 = 1$ } same

we say our function is even

2. origin Symmetry

if $f(-x) = -f(x)$



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

$= -8$

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

$= 8.$

$f(-2) = -f(2)$

$-8 = -(8)$

an odd function

even function

$f(-x) = f(x)$

odd function

$f(-x) = -f(x)$