Utsav Bali
Calculus Review
1991- 1993

Orbital Notation (∞)
Function Notation $f(x)=y$
Mapping Notation $x \mapsto y$

$x_2+y_2=1$ Eq of a Circle $= x^2+y^2=r^2$

$\left(\frac{x_2+x_1}{2}, \frac{y_2+y_1}{2}\right)=m$

$m=\frac{y_2-y_1}{x_2-x_1}, \frac{\Delta y}{\Delta x}$, $\frac{\text{under } y}{\text{under } x}$, m

~~Ax+B~~ $\boxed{\sqrt{(x_2-x_1)^2+(y_2-y_1)^2} = \text{Distance}}$ → V.V.V. IMP

$Ax+By+C=0$ → Gen form.
$y=mx+b$ → Slope intercept.
$y_2-y_1=m(x_2-x_1)$ → Point slope

Pick point
slope intercept form → numerator moves up or down & den. moves left or right.

~~X-Y interc~~
@ X-Y intercept form. solve eq for x & y ~~...~~ & look at the last value.

Equal slope gives ∥ lines & -ive reciprocals give ⊥ lines. IMP

Division or multiplication by a -ive # changes the INEQUALITY sign.

$\{(-3,4), (2,8), (7,6), (-3,5)\}$
$D=\{-3,2,7\}$ → do not repeat any.
$R=\{4,8,6,5\}$

Relation – A set of ordered pairs where the 1st coordinate forms the Domain & the 2nd coordinate forms the Range.

Function → A correspondence that assigns to a # in a certain set, called Domain, one & only one member in the second set, called Range. – IMP IMP

X is the independent variable & Y is the dependent value.
X should not be repeated in a ~~sele~~ set, for the relation to be a FUNCTION.
Vertical line test for the Functions.
The Domain ~~for~~ for the eq $y=mx+b$ will always be all reals i.e $(-\infty,\infty)$

$\frac{2}{2}$ → $D=(-\infty,\infty)$
$R=[2]$

$y=\frac{4}{x+2}$ $D=\{x \mid R,\ x\neq -2\}$
$D=(-\infty,-2)(-2,\infty)$ (-2 is not included)

$y=\sqrt{x+3}$ – cannot have -ive in the radical
∴ $D=\{x \mid R,\ \cancel{x\neq}\ x\geq -3\}$
$D=[-3,\infty)$

$(x) = x^2 - 3$

$f[g(5)] \Rightarrow f(25-3) \Rightarrow f(22)$

$= 484 - 3 = \underline{481}$

Difference quotient

$f(x+h) - f(x) / h$

$f(x) = 2x - 7$

$2(x+h) - 7 - (2x-7) / h$

$\cancel{2x} + 2h - \cancel{7} - \cancel{2x} + \cancel{7} / h$

$2\cancel{h}/\cancel{h} = \underline{2 = m}$

V.V.V IMP

Piece-wise defined functions IMP

$f(x) = \begin{cases} 1, \text{ if } x \geq 0 \\ 2, \text{ if } x < 0 \end{cases}$

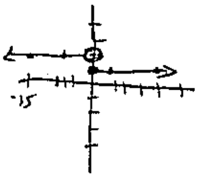
$f(4) = 1$

$f(1/2) = 1$

$f(-15) = 2$

$f(0) = 1$

$f(-3) = 2$



has to be a function.

Even Functions → are symmetric w respect ~~to~~ y-axis

algebraically → ~~the~~ insert $(-x)$ in place of x & if the result is the same then its an even funct. $f(x) = x^4$

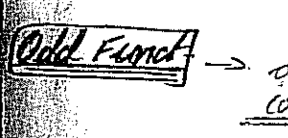
$(-x)^4 = \underline{x^4 = x^4}$

Odd Funct → are symmetric w respect ~~to~~ x-axis. On inserting a $(-x)$ the result is a <u>complete opposite</u> of the eqn. $f(x) = x^3$

$= (-x)^3 - -x \neq x$

If the result is not opposite or the same then the funct. is neither even or odd

Increasing & Decreasing functions



dec $(-\infty, -4]$, inc $[-4, 0]$ dec $[0, 4]$ const. inc. $[7, \infty)$

Special Funct.

Constant funct.

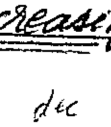
$f(x) = c$

$R = [c]$

$D = (-\infty, \infty)$

Constant.

Even funct.



2) **Identity Funct.**

$f(x) = x$

$R = (-\infty, \infty)$

$D = (-\infty, \infty)$

Increasing funct.

odd funct.

3) **Absolute value funct.**

$f(x) = |x|$

$R = [0, \infty)$

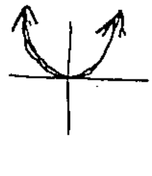
$D = (-\infty, \infty)$

both Inc & dec funct.

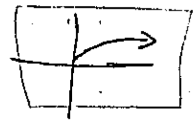
Even funct.

→ Identity function turned +ve.

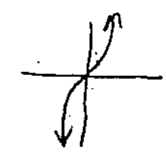
Square funct
$f(x) = x^2$
$D = (-\infty, \infty)$
$R = [0, \infty)$
even funct.
Inc & dec funct.



5). Square root funct
$f(x) = \sqrt{x}$
$D = [0, \infty)$
$R = [0, \infty)$
Increasing funct.
? odd or even



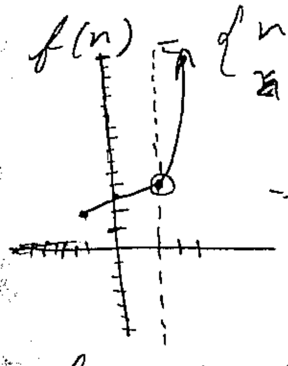
6). Cube funct
$f(x) = x^3$
$D = (-\infty, \infty)$
$R = (-\infty, \infty)$
Inc. funct.
odd funct



- If the Numerical coefficient is greater than 1 then it will narrow the sketch towards the y-axis
- If the num-coeff is between 0 & 1 then it will widen the graph away from the y-axis
- If the num. coeff is less than 0 then it flips the graph
- Adding of a constant moves the graph up or down
- A constant in the symbol of inclusions moves the graph left or right opposite the sign on the constant.

IMP

$$f(x) = \begin{cases} x+2 & \text{if } x \le 1 \\ 4x^2 & \text{if } x > 1 \end{cases}$$



→ Is a curve as $4x^2$ is a square funct.

Algebra of functions – to perform these operations, the Domain of the 2 functions have to be the same → MOST IMPORTANT.

1). $(f+g)(x) = f(x) + g(x)$
2). $(f-g)(x) = f(x) - g(x)$
3). $(f*g)(x) = f(x) * g(x)$
4). $(f/g)(x) = f(x) / g(x)$

IMP

$f(x) = \{\cancel{(1,2)}, (3,6), (5,7)\}$
$g(x) = \{\cancel{(-3,1)}, (3,8), \cancel{(4,-7)}, (5,-2)\}$
$(f+g)(x) = 14 \ (8+6)$
$(f+g)(x) = 5 \ (7+(-2))$

$(f \circ g)(x) = f[g(x)]$ → COMPOSITION functions.

$f(x) = x^2 - 1$
$g(x) = 2x + 3$

$(f \circ g)(2) = f[g(2)]$
$= f[7]$
$= 48$

$f(x) = \{(1,2), (3,4), (-1,0)\}$
$g(x) = \{(2,1), (4,3), (0,-1)\}$

Inverse functions are mere images of the identity line

$m(x) = \{(3,4), (5,1), (-8,4)\}$

$m(x)^{-1} = \{(4,3), (1,5), (4,-8)\}$ → is not a function } $\boxed{IMP}$

$f(x) = 3x-5$

$f(x)^{-1} = \frac{x+5}{3}$

$(f^{-1} \circ f)(x) \Rightarrow f^{-1}\ \frac{3x-5+5}{3} = \underline{x}$

The Domain of Inverse functions is also the same like the Normal functions $\boxed{IMP}$

Test for Invertibility is done by a Horizontal line test → $\boxed{IMP}$

Identity line passes through the origin & is increasing. On folding the Identity line, both the functions must overlap each other.

Hyperbola is both an Inverse & a Normal function.

To find the Inverse funct. algebraically, shift the x & the y variables & then solve for y.

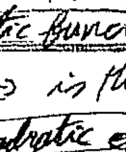
If $f(x)$ is an inverse of $g(x)$ we do this:

$$f[g(x)] = x \quad g[f(x)] = x \rightarrow IMP \ \boxed{IMP}$$

Function in the form of $f(x) = ax^2 + bx + c$ where a, b, c are Integers & $a \neq 0$ is called a quadratic funct. (square funct.)

Vertex → is the turning point or the extreme point is also called the maximum or minimum

A quadratic eq is a square funct. & so the graph is a parabola



In the eq if $a<0$ then the graph opens downwards resulting in a maximum pt & if $a>0$ then the graph opens upwards resulting in a minimum pt

1). The vertex can be found by the formula $\left[-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right]$ $\boxed{IMP}$

2). It can also be found by using the "Completing the Square" method.

x intercepts can be found by subbing "0" in for the y variable & solve for x by FACTORIZATION

x intercepts can also be found by using "Completing the square"

x intercepts can be found by using the quadratic formula $\frac{-b \pm \sqrt{b^2-4ac}}{2a}$ $\boxed{V.V.V. IMP}$

Y-Intercept can be found by subbing "0" for x in the eq

Y-Intercepts can also be found by using Synthetic division

The AXIS OF SYMMETRY always passes through either the maximum or the minimum point. $\boxed{V.V.V. IMP}$

$f(x) = c \rightarrow$ constant funct.

$ax + bx + c = 0 \rightarrow$ linear funct. } are polynomial functions, the coefficient is real #s & the

$ax^2 + bx + c = 0 \rightarrow$ quad. funct. } exponent has a non-negative integer.

$f(x) = 0 \rightarrow$ ZERO POLYNOMIAL FUNCTION

Power functions $\rightarrow f(x) = ax^n$ where $a \neq 0$ & n = +ive integer greater than one

a). where 'n' is even symmetry to the y-axis then ~~its~~ the graph is a parabola.

b). when 'n' is odd then its symmetric to the origin & so is a squiggly line.

In addition to the rest of the rules in ~~other~~ modifying a graph in power function we $\boxed{\text{flatten}}$ the graph from its bottom as the power increases } $\boxed{\text{V.V.V. IMP}}$

Zeros of a function are the X-INTERCEPTS $\rightarrow \boxed{\text{IMP}}$

Polynomial funct. in a LINEAR FACTOR FORM $\Rightarrow (x-1/2)(x+1)(x+1)(2x+5)$

$\boxed{N}$ is the degree of the polynomial

$\boxed{N-1}$ is the no. of peaks & valleys the graph would have.

zeros $\rightarrow 1/2, -1, -5/2$

Multiplicity $\rightarrow 1, 2, 1 = 4 = N =$ the deg. of the poly. } $\boxed{\text{V.V. IMP}}$

# of peaks & valleys $\Rightarrow N-1 = 3$

$\boxed{\text{\# zeros = deg of pol.}}$

These graph are CONTINUOUS curves ~~as~~ they never stop. IMP

SYNTHETIC DIVISION $\rightarrow$ $f(x) = x^3 + 2x^2 - 2x + 3$

Division Algorithm $\rightarrow$ if $f(x)$ & $D(x)$ are non constant polynomial where the degree of $f(x) \geq$ the degree of $D(x)$, where $D(x) \neq 0$ then there exists unique polynomial $Q(x)$ or $R(x)$ such that:

$$\underset{\text{divident}}{f(x)} = \underset{\text{divisor}}{D(x)} \times \underset{\text{quotient}}{Q(x)} + \underset{\text{Remainder}}{R(x)}$$ } $\boxed{\text{IMP}}$

$\boxed{\text{IMP}}$
- the deg of $D(x) \leq$ the deg of $f(x)$
- the deg of $R(x)$ ~~$\leq$~~ $<$ the deg of $D(x)$ or $R(x) = 0$
- the deg of $R(x) < f(x)$

$\boxed{\text{V.V.V. IMP}}$

Synthetic division is used if we have a $\boxed{\text{LINEAR BINOMIAL DIVISOR}}$ as $x-c$ but not as x or 4 itself. IMP

In Synthetic division, the $\boxed{\text{divisor}}$ is the opposite of the constant of the original divisor i.e in $x+3$, the divisor is -3.

$-3]$

The divident is the numerical coefficients ~~in~~ in the INCREASING ORDER of the VARIABLE DEGREE

$$\begin{array}{r|rrrr} -3 & 1 & 2 & -2 & 3 \\ & \downarrow & -3 & 3 & -3 \\ \hline & 1 & -1 & 1 & \boxed{0} \end{array}$$

$\rightarrow$ Remainder $\rightarrow$ IMP } $\boxed{\text{V.V.V. IMP}}$

This is a **depressed eq** as the power is decreasing. ~~At~~ The quotient is (n^2-n+1) & the remainder is 0 & the answer is written as

$(n^2-n+1)+0$ → IMP

The proper form to write an answer is $\boxed{D(n)\,[Q(n)] + R(n)}$

If we have the coefficients of the divident given like:

7 3 2 8 1

Then the power of the first term i.e 7 of the ~~quo~~ divident will be $(n-1)$ where 'n' is the total # of coefficients. The power on the quotient would be $(n-2)$.

V.V. IMP

Remainder Theorem ⇒ if $f(n)$ is a polynomial funct. where degree $n>0$ is divided by $(n-c)$, then the $\boxed{f(c) = \text{Remainder}}$

and

$(n-2)$ is a factor of the polynomial $f(n)$ because the $\boxed{\text{Remainder} = 0}$ In other words $\boxed{-2 \text{ is a ZERO OF THE POLYNOMIAL } f(n).}$

Factor Theorem ⇒ if $f(n)$ is poly. funct. where deg of $f(n)$, $n>0$ & $f(c)=0$ then $(n-c)$ is a factor of $f(n)$. Conversely if $(n-c)$ is a factor of $f(n)$ then $f(c)=0$

$f(n) = \{n^3+2n^2-13n+10\}$ find $\{-5,-4,-3,-2,-1,0,1,2,3,4,5\}$

$n > 3$ $\{n \mid n > 3\}$ or $\{n \mid n \geq 3\}$

$(3, \infty)$ $[3, \infty)$

Slope = $\frac{Y_2 - Y_1}{X_2 - X_1}$ or $y = \cancel{mx+b}$ ↳ slope = Rise/run

A line rising from left to right has a +ve slope & a line falling from left to right has a −ve slope.

A horizontal line has a zero slope & a vertical lines slope is undefined.

Mid point = $\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2}\right)$

distance = $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Gen form for the eq of a circle = $(x-h)^2 + (y-k)^2 = r^2$

Here center = $C = (h, k)$ & Radius = r

General form of a line = $ax + by + c = 0$

Slope Intercept form of an ~~equal~~ linear eq = $y = mx + b$

Point slope form of a lin eq = $y_2 - y_1 = m(x_2 - x_1)$

Slope Intercept & Point slope form can be transform into the General formula for the line.

Graphing methods:

1. Pick point method (3 pts)
2. Slope intercept method (2 pts)
3. X-Y intercept method (2 pts)

When the slopes are equal & the y-int(s) is different then the two lines are said to be parallel & when the slopes are the negative reciprocals of each other then they are perpendicular to each other.

Relation — A set of ordered pairs where the abscissa forms the Domain & the ordinate forms the Range. When showing the Domain or Range of a relation do not repeat a given Domain twice.

Function — A correspondence that assigns to each # in a Domain one & only one # in the 2nd set called Range. The Range is the dependent value & the Domain is the Independent value. To check if eqns are functions or not they should have a different domain all through the relation for their respective ranges. This could also be checked graphically by using the vertical line test. $x = 5$ is not a function but $y = 5$ is a function.

- Improve Training and Documentation processes through PMTs and Knowledge Transfer Executive Council (KTEC)

DOMAIN OF ALL LINEAR EQN IS ALL REAL NUMBERS. The Domain of the function $y = 5 - x$ will be $(-\infty, \infty)$ & the RANGE = [5] → IMP.

- Training Delivery Media

There are 2 exceptions for Domain ~~& Range~~. If the eq is a fractional eqn then the denominator has to be greater than 0 eg $\frac{1}{x-2}$ D = All R's & $x > 2$. The second exception is that if its a square root function then there cannot be a

- NSD Work Center Task Analysis

negative # in the radical symbol eg $\frac{1}{\sqrt{x-2}}$ here D = All R's & $x - 2 \geq 0$ ∴ $x \geq 2$. If the function is $\sqrt[3]{x-3}$ then it can be simplified as $x \to$ IMP & in this case $\to \frac{1}{\sqrt{x-2}}$ the D = $x - 2 \geq 0$ ∴ $x \geq 2$ & $x - 2 \geq 0$ ∴ $x \geq 2$.

August 26, 1991

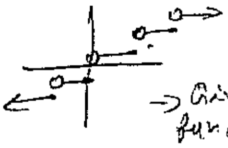
DIFFERENCE QUOTIENT → $\frac{f(x+h) - f(x)}{h}$ where $h \neq 0$

so $f(x) = 2x - 7 = \frac{2(x+h) - 7 - (2x-7)}{h} = \frac{2x + 2h - 7 - 2x + 7}{h} = \frac{2h}{h} = 2$

* $f(x) = 2x - 7$; find $f(6) = 12 - 7 = 5$; find $f(a) = 2a - 7$

* Piecewise defined functions $f(x) = \begin{cases} 1, & \text{if } x \geq 0 \to 1 \\ 2, & \text{if } x < 0 \to 2 \end{cases}$

so $f(4)$ = fits cr 1 ∴ = 1
$f(-1)$ = fits cr 2 ∴ = 2



→ Given graph is a function.

EVEN Function - are symmetric w/ respect to the y-axis & algebraically can be found out by substituting $-x$ in place for x & solve for $f(x) = $ & if the result is the same as the original eq then the function is an even function. $f(x) = x^4 \Rightarrow f(-x) = (-x)^4 \Rightarrow f(x) = x^4$.

ODD function - is graphically symmetric to the origin & HAS TO BE ON BOTH THE SIDES OF THE GRAPH of + → not this but this → +.

SO AN IDENTITY FUNCTION IS AN ODD FUNCTION. algebraically on substituting $-x$ for x the result should be totally opposite to the original eq.

A function w/ a +ive slope is an increasing function & w/ a -ive slope is a decreasing function.

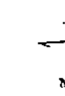
* → the Domain for this graph is $= (-\infty, 0] [0, \infty)$ & $R = [0, \infty)$ {to down to up} →

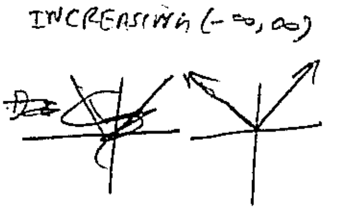
When trying to see if the function is increasing or decreasing we measure the Domain to determine it.

6 basic function → 1). Constant funct. $f(x) = c$ — $D = (-\infty, \infty)$, $R = [c]$, Constant, EVEN

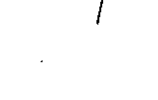
2). Identity funct. → $f(x) = x$ — $D = (-\infty, \infty)$, $R = (-\infty, \infty)$, ODD & INCREASING $(-\infty, \infty)$, DOMAIN COMPARED.

3). Square funct. → $f(x) = x^2$ — $D = (-\infty, 0] [0, \infty)$, $R = [0, \infty)$, DEC → $(-\infty, 0]$ & INC $[0, \infty)$, EVEN FUNCT.

). Cube funct → $f(x)=x^3$  $D=(-\infty,\infty)$
$R=(-\infty,\infty)$
ODD FUNCT.
INCREASING $(-\infty,\infty)$

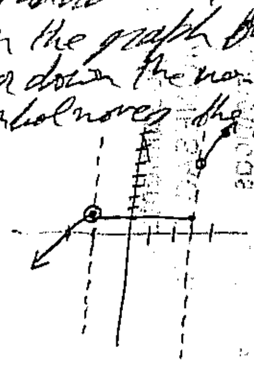
. ~~A~~ Absolute value → $f(x)=|x|$  $D=(-\infty,0][0,\infty)$
$R=[0,\infty)$
EVEN FUNCT.
DEC $(-\infty,0]$ INC $[0,\infty)$

All linear functions with ~~one~~ power of one are straight lines on a graph & all functions w/ power more than one are curves.

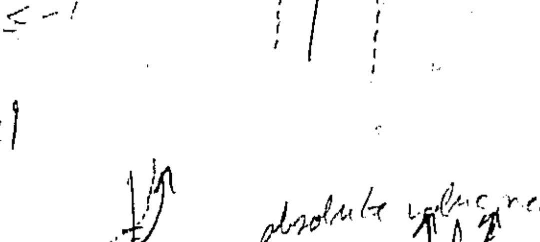
Square root funct. → $f(x)=\sqrt{x}$  $D=[0,\infty)$
$R=[0,\infty)$
NEITHER EVEN NOR ODD
INC → $[0,\infty)$

- -ve coefficient flip the graph
- coefficient greater than 1 narrows to y-axis
- coefficient less than 1 widen the graph away from x-axis.
- adding a constant moves up or down the no. of places
- constant under a radical symbol moves the place opposite the sign of the constant on either left or right side.

$$f(x)=\begin{cases} 2x, & x>3 \\ 1, & -1<x\le 3 \\ x+2, & x\le -1 \end{cases}$$



$g(x)=|x^3+2|$

IMP  absolute value means that $y\neq 0$ $y>0$

Leave fractional answers simplified in one fraction only.

To do algebra w/ functions, the Domain of the 2 functions should be the same. eg $f(x)=x^2-1$ → D = All R's & $g(x)=2x+3$ → D = All R's so could be worked on. Eg → $f(x)=\{(-2,?),(3,6),(5,?)\}$
$g(x)=\{(-2,1),(3,8),(4,?),(5,-2)\}$
→ now $f(x)+g(x)$ = $8+6=14$ $?+(-?)=5$

1). $(f+g)(x) = f(x) + g(x)$
2) $(f-g)(x) = f(x) - g(x)$
3. $(f\times g)(x) = f(x)\cdot g(x)$
4). $(f/g)(x) = f(x)/g(x)$ where $g(x) \neq 0$

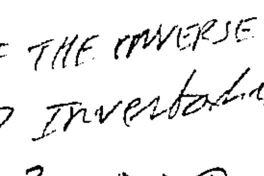
* COMPOSITION FUNCTION $\Rightarrow$ $(f\circ g)(x) = f[g(x)]$ or $(g\circ f)(x) = g[f(x)]$
$f[g(x)] \to (f\circ g)(x)$
$g[f(x)] \to (g\circ f)(x)$

* NOTE $\to$ $\dfrac{6x^2+11x+3}{-7x^2+37x-10} = \dfrac{6x^2+11x+3}{(-7x-2)(x+5)}$ where $x \neq \frac{2}{7}; -5; \frac{-1}{3}$

DO NOT FORGET TO MENTION THE 2 EXCEPTIONS IN DIVISION & FRACTION

$f(x) = \{(1,2), (3,4), (-1,0)\}$ $\to$ both are functions.
$f(x)^{-1} = \{(2,1), (4,3), (0,-1)\}$
Both the relations are called inverse functions.
$m(x) = \{(3,4), (5,6), (-8,4)\}$ $\to$ Funct.
$m(x)^{-1} = \{(4,3), (6,5), (4,-8)\}$ $\to$ not a funct.

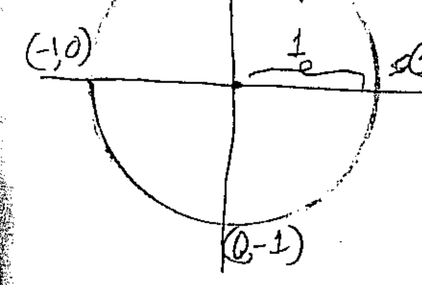
* $\to$ A function is said to be invertible if the relation formed by interchanging the 'D' & 'R' of each ordered pair of the given function is a function.
If $f(x)$ is a function then f^{-1} is the inverse function.
DOMAIN OF THE INVERSE FUNCTION ALSO HAS ALL REAL NO'S. WITH 2 EXCEPTIO
* Test for invertability can be done w/ the Horizontal line te
$f(x) = x^2$; $x \geq 0$ $\to$ MIND THE EXCEPTION.



Where the orig funct. graph crosses the Identity line the inverse funct. graph also crosses the same point.
Hyperbola is both inverse & normal funct. P.T.O

Trig functions are real nos based on a circle or unit circle. Developed by Hipparchus.

Unit Circle – $x^2+y^2=1$ → radius; normal circle – $(x-h)^2+(y-k)^2=r^2$

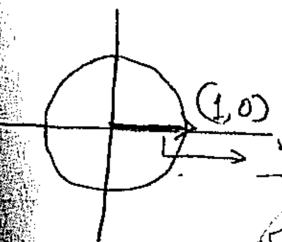


Circumference of a Unit Circle $= 2\pi = 2\pi(1)$

IMP { $V=\frac{4}{3}\pi r^3$ } Length of subtended arc at an ∠ of 2π rad $= 2\pi \times r = 2\pi$

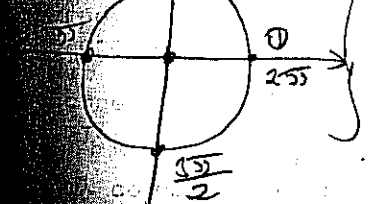
As wrapping functions one rotation on a number line is = 6.28 & two rotations is = 12.56 units.

-ive reals are generated in a clockwise rotat-n & +ive reals are generated in a counterclockwise rotation.

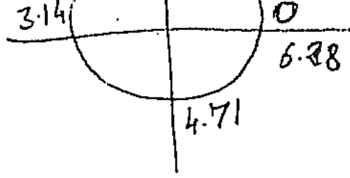


"Initial Ray" → always starts at +ive x-axis.
Rotation of initial ray towards any other direction calls it a "TERMINAL RAY"

POSITIVE ROTATION



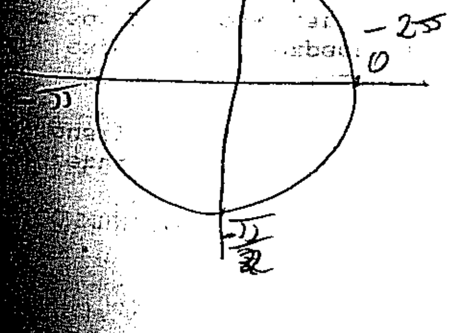
RADIAN Measures,

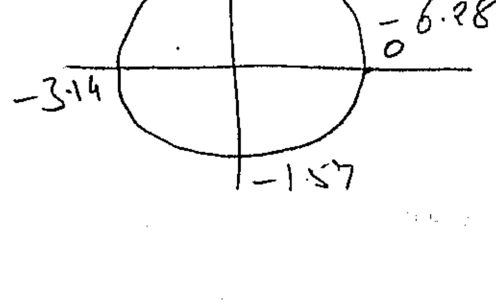


REAL measures

IMP

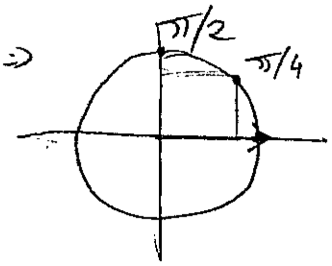
NEGATIVE ROTATION





* $W(0) = (1,0)$ * sine $t = y$
$W\left(\frac{\pi}{2}\right) = (0,1)$ cosine $t = x$
$W(\pi) = (-1,0)$ tangent $t = y/x = x \neq 0$
$W\left(\frac{3\pi}{2}\right) = (0,-1)$ Cosecant $t = 1/y$ $y \neq 0$
$W(2\pi) = (1,0)$ secant $= 1/x$ $x \neq 0$
cotangent $= x/y$ $y \neq 0$

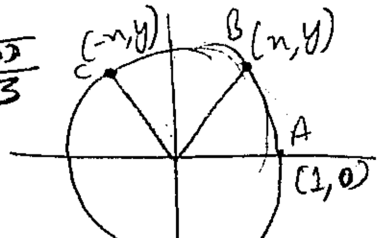
* $\frac{\pi}{4} \Rightarrow$



$x^2+y^2=1$
2 coordinates must be the same
$= x^2+y^2=1$ $\Rightarrow x = \pm\frac{\sqrt{2}}{2}$
$x^2+x^2=1$
$=2x^2=1$
$x^2=1/2$

$\therefore \frac{\pi}{4} = 45° = \left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

* $\frac{\pi}{3}$



located in 2nd quad.

$AB = BC$
$\therefore \overline{AB} = \overline{BC}$
$\therefore \left(\sqrt{(1-x)^2+(0-y)^2}\right)^2 = \left(\sqrt{(x+x)^2+(y-y)^2}\right)^2$
$=(1-x)^2+y^2 = 4x^2$
$1-2x+x^2+y^2=4x^2$
$1-2x+y^2=3x^2$
solve for y^2 & subst. in $x^2+y^2=1$
$\cdot\, y^2 = 1-x^2$

$\frac{\pi}{3} = 60° = \left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

$\Rightarrow 1-2x+1-x^2=3x^2$
$0=4x^2+2x-2$
$0=2x^2+x-1$
$0=(2x-1)(x+1)$
$x=1/2,$ ~~-1~~

$y^2=1-1/4=\frac{3}{4}$
$y=\pm\frac{\sqrt{3}}{2}=y$

QUEST COMMUNICATIONS EFFECTIVENESS SURVEY - Bill Scheerer, Round 1

Please return to Bill Scheerer at hoqaxiwgs or attmail!wscheerer, or by paper (anonymously is fine)

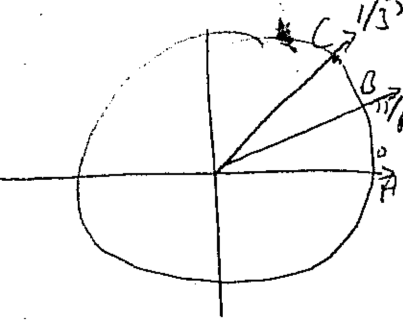
Please rate my communications using a scale of:
1 = far exceeds your expectations
2 = exceeds your expectations
3 = meets your expectations
4 = needs improvement
5 = unsatisfactory

keeping in mind the stated intent of the communications:
A = to inform or explain
B = to enroll or enlist
C = to request or command

Is my communication:

	(rating)
timely	____
concise	____
clear	____
effective	____
to the right audience	____
consistent	____
accurate	____
open/candid	____
constructive	____

$\theta = \frac{\pi}{6}$ located in 1st quad.



$\pi/4$ { IF THE ARCHS ARE EQUALL THEN THE SEGMENTS ARE EQUALL TOO

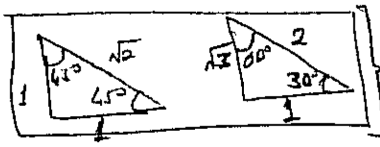
$$\left(\sqrt{(x-1)^2+y^2}\right)^2 = \left(\sqrt{(x-\tfrac{1}{2})^2+(y-\tfrac{\sqrt{3}}{2})^2}\right)^2$$

$$= (x-1)^2+y^2 = (x-\tfrac{1}{2})^2+(y-\tfrac{\sqrt{3}}{2})^2$$

$$= x^2-2x+1+\cancel{y^2} = \cancel{x^2}-x+\tfrac{1}{4}+\cancel{y^2}-\sqrt{3}y+\tfrac{3}{4}$$

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

$\frac{\pi}{6} = 30° = \left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$



VVV. IMP

$$x^2 = 3y^2$$
$$x^2+y^2=1$$
$$3y^2+y^2=1$$
$$y^2 = 1/4$$

$y = \pm\frac{1}{2}$ in first quad. so $1/2$

$x^2 = 3(\frac{1}{4})$
$x^2 = 3/4$ $x = \frac{\sqrt{3}}{2}$ & +ive as in 1st quad

TRIG IDENTITIES

$\sin\theta = \frac{1}{\csc\theta}$ $\quad$ $\csc\theta = \frac{1}{\sin\theta}$

$\cos\theta = \frac{1}{\sec\theta}$ $\quad$ $\sec\theta = 1/\cos\theta$

$\tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{1}{\cot\theta}$ $\quad$ $\cot\theta = \cos\theta/\sin\theta = \frac{1}{\tan\theta}$

To find if a given coordinate is the coordinate of a unit circle simply add the squares of the x & y coordinate & if the sum is equal to '1' then it is a unit circle.

The circumference of a unit circle is $= 2\pi r = 2\pi = 360°$

COTERMINAL ANGLES => are angles that start with the same initial ray & have the same terminal ray.

eg $\frac{\pi}{4} = \frac{7\pi}{4} = \frac{9\pi}{4}$ or $150° = 510° = 870° = -210° = -570°$

$1^\circ = 60$ mts
1 mts = 60 sec

* <u>CONVERSIONS</u> → 28.37°

$= 28^\circ\ (.37 \times 60)\ (.2 \times 60)$ — 22.2, 12

$= \underline{28^\circ\ 22'\ 12''}$ IMP

* $72^\circ\ 15'\ 17''$

$72^\circ.\ \frac{17}{60} = .28\bar{3}$

$72.\ \frac{15 + 0.283}{60} = 0.26$

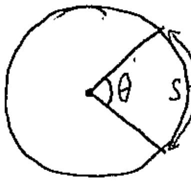
$= \underline{72.26^\circ}$

Convert rad. to deg. & deg. to rad.

* $\frac{3\pi}{2} \times \frac{180}{\pi} = \underline{270^\circ}$

* $90^\circ \times \frac{\pi}{180} = \frac{\pi}{2}$ IMP

Cut Portion = <u>SECTOR</u>



→ <u>SUBTENDED ARC</u>

→ This is <u>not</u> a <u>Unit Circle</u>.

* <u>Central ∠</u> → is an ∠ with the vertex at the center of an ∠.

* Length of the Subtended arc = $\boxed{S = r \cdot \theta}$ → IMP

* Area of a Sector = $\boxed{\frac{1}{2} r^2 \cdot \theta}$ or $\boxed{\frac{1}{2} r \cdot S}$ IMP — θ should be converted to Radians IMP

Trig functions with a radius other than one.

$\sin\theta = y/r \quad \csc\theta = r/y$

$\cos\theta = x/r \quad \sec\theta = r/x$

$\tan\theta = y/x \quad \cot\theta = x/y$

Trig functions on a <u>RIGHT △</u>

$\sin\theta$ = opp/hyp. $\csc\theta$ = hyp/opp.

$\cos\theta$ = adj/hyp $\sec\theta$ = hyp/adj.

$\tan\theta$ = opp/adj $\cot\theta$ = adj/opp.

Some people have curly brown hair turning permanently black

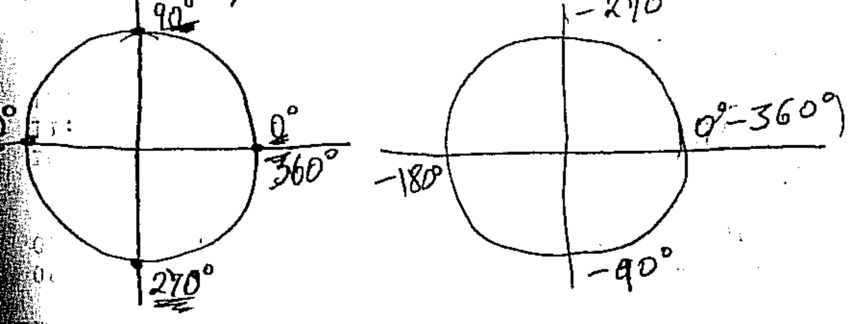
$\frac{P}{H}\ \ C\frac{B}{H}\ \ T\frac{P}{B}$

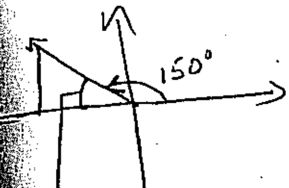
ALL STUDENTS TAKE CALCULUS

II 'S' sines & csc are +tive	I All are +tive
III tan & cot are +tive	cos & sec are +tive IV

V.V.V. IMP

'θ' will represent DEGREE measure & 't' will represent RADIAN measu





REFERENCE ∠

REFERENCE ∠ → is a +tive Acute ∠ & is forme by a line from the terminal ray ⊥ to the x-ax

* In the IInd quad, ref ∠ = 180° − given ∠.
* In IIIrd quad ref ∠ = ~~18~~ given ∠ − 180°
* In IVth quad ref ∠ = 360° − given ∠.

IF THERE ARE MORE THAN ONE ROTATIONS THEN USE—

$P(9\pi) \neq$

$P(t) = (t + 2\pi n)$ → has to be a multiple of 2π → Imp

$0 < t < 6.28$
$0 < t < 2\pi$
$0 < t < 360°$ } will always be a +tive ∠ or rad. measure } IMP

Eg $P\left(\frac{41\pi}{4}\right) = P\left(\frac{\pi}{4}, \frac{40\pi}{4}\right)$ → 1st quad $= \left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

$P = (-675°) = (45° + (-720°))$ → Ist quad
$= \left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

$(\ )^2 = \cos^2\theta$
$(\ )^2 = \sin^2\theta$
$(\ )^2 = \tan^2\theta$

PYTHAGOREAN IDENTITIES

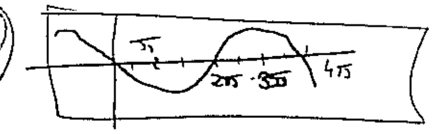
1). $\sin^2\theta + \cos^2\theta = 1$
2). $1 + \tan^2\theta = \sec^2\theta$
3). $\cot^2\theta + 1 = \csc^2\theta$

V.V.IMP

#24, 25

$\sin(-90°) = -1$
$-\sin 90° = -1$

IMP PAGE



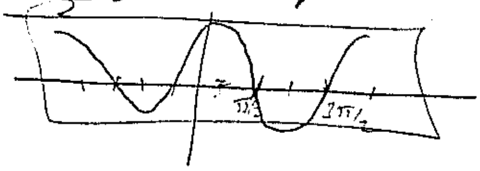
1. $\boxed{\sin(-\theta) = -\sin\theta, \text{ odd}}$

Sine is a continuous funct. & is odd & symmetric to the origin.

$\cos(-45°) = \frac{\sqrt{2}}{2}$
$\cos 45° = \frac{\sqrt{2}}{2}$

2). $\boxed{\cos(-\theta) = \cos\theta, \text{ Even}}$

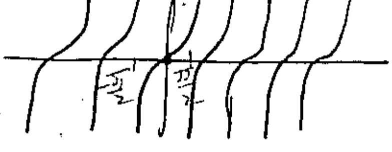
Is a continuous funct. & is even, symmetry w/ respect to 'Y' axis



$\tan(-\theta) = \frac{\sin(-\theta)}{\cos(-\theta)} = \frac{-\sin\theta}{\cos\theta}$

3). $\boxed{\tan(-\theta) = -\tan\theta, \text{ odd}}$

Has symmetry with respect to the origin & is odd



Domain of Funct. ->

sin t & cos t = {t : t = R's}

tan t = $\frac{\sin t}{\cos t}$, sec t = $\frac{1}{\cos t}$

D = {R's | cos t ≠ 0}

{t | t ≠ $\frac{\pi}{2}$ + nπ} -> Integer

cot t = $\frac{\cos t}{\sin t}$, csc t = $\frac{1}{\sin t}$

D = {R's | sin t = 0}

= {t | t = nπ} -> Real #

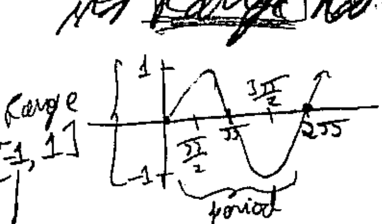
V.V.V. IMP

V.V.V. IMP

... FUNDAMENTAL PERIOD IN A SINE CURVE IS FROM $\boxed{0 \text{ TO } 2\pi}$.

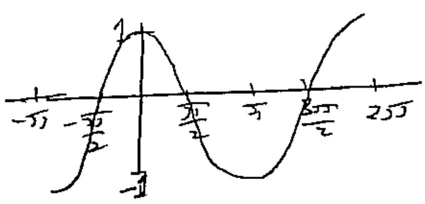
... called a complete CYCLE

A sine curve is an ~~even~~ odd continuous curve with a period of 0 & 2π but since it is odd, it intersects x-axis at 0 & at the point 2π & its Range is $[-1, 1]$. Its Domain is all reals



ALWAYS GO FROM BOTTOM TO TOP.

* A cosine curve is an even continuous funct. with a period of 0 & 2π but since it is even, it intersects x-axis at $\frac{\pi}{2}$ & $\frac{3\pi}{2}$. Its Range is $[-1, 1]$. Its Domain is all Reals.



* Gen Forms

$F(x) = a \sin(kx + b)$

$G(x) = a \cos(kx + b)$

V.V.V. IMP

1). $|a|$ determines the amplitude of the sine or cosine curve & thus changing the RANGE

a). If $a > 1$ then there is a vertical stretch

b). If $0 < a < 1$, then vertical shrink

c). If $0 > a$, then FLIP THE CURVE

From arch3!jb4 Mon May 18 11:16 EDT 1992
To: alfalfa!cec, arch2!dnn, bct, deronda, jb4, lbb, attmail!ckhoffman, attmail!ebron, attmail!joanneb, attmail!laffey, attmail!mcarey, attmail!middaugh, attmail!trohalides, drddol!mary, druks!ouray, druks!wolpert, fjtlc!allenb, homxb!sgbali, homxc!lagan, hoqax!acj, hostar!kpd, ihlpw!straka, ihlpy!napatch, indycic!gil, mtdcb!pdn!j.new, mtdcb!pdn!k.fitzgerald, mtfme!tml, mtfmi!mal, mtgzy!erk, mtunp!jim, mtunp!nee, mtuxo!llh1, nwwpa!wjb, techman!trb, uhura!lin, uhura!nam, violin!gpp, wrddo!cnile, wrddo!lgj
Subject: SuperBook Demo
Status: RO

To: Online Documentation Standards Members
Re: SuperBook Demo in Morristown

A demo of SuperBook has been scheduled for:

Thursday, May 28, 1992
9:00 am
Bellcore Building #2
445 South Street Morristown

To reach the Bellcore building from the Holmdel area:

1. Take 287 North to Exit 31
   Exit 31 is South Street Morristown
2. Turn Right at traffic light at end of ramp
3. Proceed about 1 mile
   Entrance to Bellcore in on the right
   White Brick Building - Building #2

Please get back to me to confirm your attendance.
Thanks.
John Baldasare
arch3!jb4
908-949-6205

'k' gives the horizontal changes

'k' changes the period of the curve = $\boxed{\frac{2\pi}{|k|}}$ V.V. IMP

The $\boxed{kx+b}$ in PARENTHESIS gives you the PHASE SHIFT.

= $\boxed{0} \le kx + b < \boxed{2\pi}$ → where the curve ends.

↳ where the curve begins

IMP $0 \le kx+b < 2\pi$

The addition or substraction of a CONSTANT moves the x-axis UP or DOWN depending on the SIGN of the CONSTANT.

THE CONSTANT IS ALWAYS OUTSIDE THE PARENTHESIS → IMP

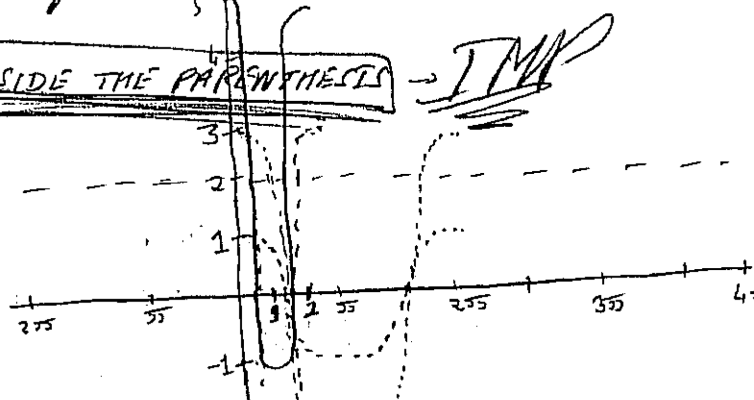
$y = 2 + 3\cos \pi x$

$\frac{2\pi}{|\pi|} = 2$

$R = [-1, 5]$

Per = 2

D = R's

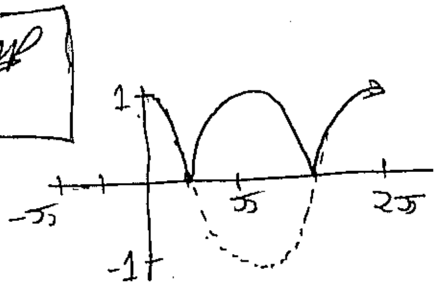


$y = |\cos x|$ → IMP

R's

[0,1]

2π



...h the csc & sec curves, first graph the sin or cos curves ...tively & then sketch the csc or sec curves with the help of ...AL ASYMPTODES → the place where the curve hits the x-axis.

V.V.V IMP

... sec curves have ~~no~~ Amplitude & only verticle asymptodes & Range changes.

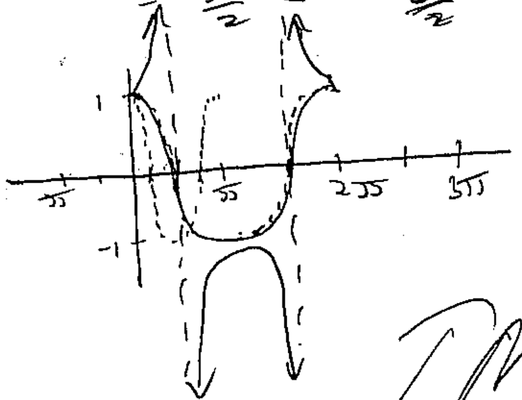
* NO AMPLITUDE → IMP

$y = \sec(-2x - \pi)$

Per $= \pi$

P.S $= 0 \le 2x - \pi < 2\pi$

$= \frac{\pi}{2} \le x < \frac{3\pi}{2}$



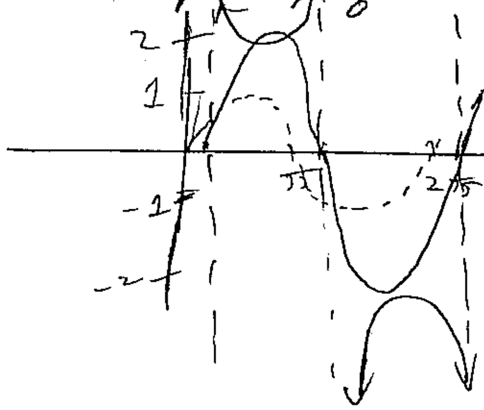
~~$y = \sec(x + \frac{5\pi}{6})$~~

$y = 2\csc(x - \frac{\pi}{6})$

$y = 2\sin(x - \frac{\pi}{6})$

Per $= 2\pi$

P.S $= \frac{\pi}{6} \le x < \frac{13\pi}{6}$



R = [2, ∞) [-∞, -

IF $y = \sin(-x + \frac{\pi}{2})$

odd or $y = \csc(-x + \frac{\pi}{2})$ THEN $y = -\sin(x - \frac{\pi}{2})$

$y = -\csc(x - \frac{\pi}{2})$

IF $y = \cos(-x + \frac{\pi}{2})$

Even or $\sec(-x + \frac{\pi}{2})$ THEN $y = \cos(x - \frac{\pi}{2})$

$y = \sec(x - \frac{\pi}{2})$

From hostar!kpd Wed May 20 11:18 EDT 1992
Message-Version: 2
>To: homxb!sgbali
From: kpd
Date: Wed May 20 11:24:16 EDT 1992
UA-Content-ID: <PMX-LAN-2.2.1-*****-hostar-kpd-791>
End-of-Header:
Email-Version: 2
Phone: 908-949-9175
UA-Message-ID: <winPMXSTAR-2.2.1b-kpd-XXXXXXXXY-10>
To: homxb!sgbali
In-Reply-To: your message of Mon May 18 12:03 EDT 1992
End-of-Protocol:
Content-Type: Text
Content-Length: 1036
Status: R

Shri,

Those who are subscribing to our LAN (Marc, John, and me so far. Jim is next) can get their mail from the LAN without logging on to homxb thereby saving money. The LAN server, hostar connects to the Datakit network and gets my mail from homxb a present.

- KP

To graph the tan & cot curves:

The tan & cot curve is an odd funct- symmetric to the origin.
Its RANGE is $[-\infty, \infty]$. The Domain is $\{R = \text{int. } \cos \neq 0\}$

The fundamental PERIOD = 0 to π. → IMP

The formula for finding the Per. of tan & cot curve is = $\boxed{\frac{\pi}{|k|}}$ IMP

The phase shift = $\boxed{-\frac{\pi}{2}} < kx+b < \boxed{\frac{\pi}{2}}$ → IMP

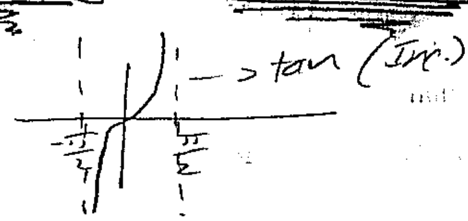
→ no '≤' → IMP

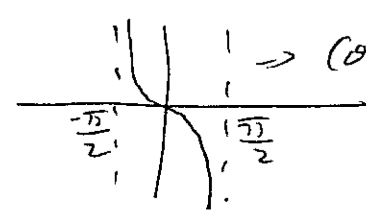
IMP

The TANGENT is an INCREASING FUNCT. & COTANGENT is a DECREASING FUNC

Has no amplitude → IMP

If $a > 1$, then it thins the curve.
If $0 < a < 1$, then it widens the curve.
If $0 > a$, then the curve is flipped





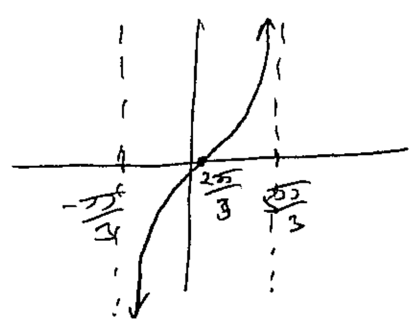
$y = \tan\left(\frac{x}{2} - \frac{\pi}{3}\right)$

Per $= 2\pi$ $D = \{R's \mid \cos \neq 0\}$

$R = [-\infty, \infty]$

$P.S = -\frac{\pi}{2} < \frac{x}{2} - \frac{\pi}{3} < \frac{\pi}{2}$

$= -\frac{\pi}{3} < x < \frac{5\pi}{3}$



IMP THE ZEROS of a curve are the points on the x axis where the curve intersects.

Per $= 2\pi$

$\therefore$ zero $= -\frac{\pi}{3} + \pi = \frac{2\pi}{3}$

------------- Begin Original Message -------------
Message-Version: 2
From: homxb!sgbali
Date: Mon May 18 12:03 EDT 1992
Received: from homxb by hostar.ho.att.com; Mon, 18 May 1992 12:02 EDT
End-of-Header:
Email-Version: 2
To: homxb!kpd
End-of-Protocol:
Content-Type: text
Content-Length: 475

KP,
Are we all moving to a new system?
Shri
>From kpd Fri May 15 11:19 EDT 1992
Status: RO

NOTICE: The login 'homxb!kpd' which is owned by k.p.das has been moved to 'hostar!kpd'. Your mail has been automatically forwarded. This mail forwarding service will only be available for a finite length of time, so please note the new address and begin using it as soon as possible.

Thank you,

HOCC UNIX Support Group

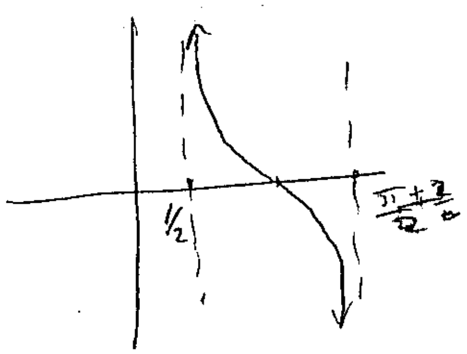
* $h(x) = \cot(2x-1)$

per $= \frac{\pi}{2}$

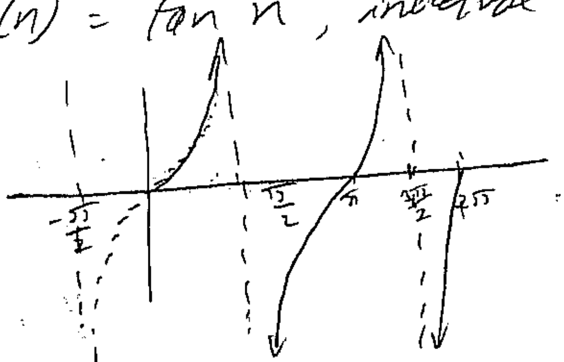
p.s $= -\frac{\pi}{2} < 2x-1 < \frac{\pi}{2}$

$\frac{1}{2} < 2x < \frac{2+\pi}{2}$

zero $= \frac{\pi}{4} + \frac{1}{2}$



* $f(x) = \tan x$, interval $[0, 2\pi]$



} → IMP

If $y = \tan(-x+\frac{\pi}{2})$, then $y = -\tan(x-\frac{\pi}{2})$

If $y = \cot(-x+\frac{\pi}{2})$, then $y = -\cot(x-\frac{\pi}{2})$

IMP

ELEMENTARY IDENTITIES

PYTHAGOREAN IDENTITIES

1) $\sin^2\theta + \cos^2\theta = 1$
2) $1 + \tan^2\theta = \sec^2\theta$
3) $\cot^2\theta + 1 = \csc^2\theta$

Odd-Even Identities

a). $\sin(-t) = -\sin t$
b). $\cos(-t) = \cos t$
c). $\tan(-t) = -\tan t$
d). $\csc(-t) = -\csc t$
e). $\sec(-t) = \sec t$
f). $\cot(-t) = -\cot t$

Basic Identities

a). $\sin\theta = \frac{1}{\csc\theta}$ $\csc\theta = \frac{1}{\sin\theta}$

b). $\cos\theta = \frac{1}{\sec\theta}$ $\sec\theta = \frac{1}{\cos\theta}$

c). $\tan\theta = \frac{1}{\cot\theta}$ $\cot\theta = \frac{1}{\tan\theta}$

d). $\tan\theta = \frac{\sin\theta}{\cos\theta}$ $\cot\theta = \frac{\cos\theta}{\sin\theta}$

Sum & Difference Formulas

$\cos(t+s) = \cos t\cos s - \sin t\sin s$

$\cos(t-s) = \cos t\cos s + \sin t\sin s$

$\sin(t+s) = \sin t\cos s + \sin s\cos t$

$\sin(t-s) = \sin t\cos s - \sin s\cos t$

$\tan(t+s) = \dfrac{\tan t + \tan s}{1 - \tan t\cdot\tan s}$

$\tan(t-s) = \dfrac{\tan t - \tan s}{1 + \tan t\cdot\tan s}$

If given a single term such as $\tan\frac{19\pi}{12}$

IMP try to break it into something with the denominator of 3 4 or

DOUBLE ∡ FORMULAS

1). a) $\cos 2t = \cos^2 t - \sin^2 t$

b). $\cos 2t = 1 - 2\sin^2 t$

c). $\cos 2t = 2\cos^2 t - 1$

2). $\sin 2t = 2\sin t\cos t$

3). $\tan 2t = \dfrac{2\tan t}{1-\tan^2 t}$

HALF ∡ FORMULAS

$\cos\frac{1}{2}t = \pm\sqrt{\dfrac{1+\cos t}{2}}$

$\sin\frac{1}{2}t = \pm\sqrt{\dfrac{1-\cos t}{2}}$

$\tan\frac{1}{2}t = \pm\sqrt{\dfrac{1-\cos t}{1+\cos t}}$

IMP

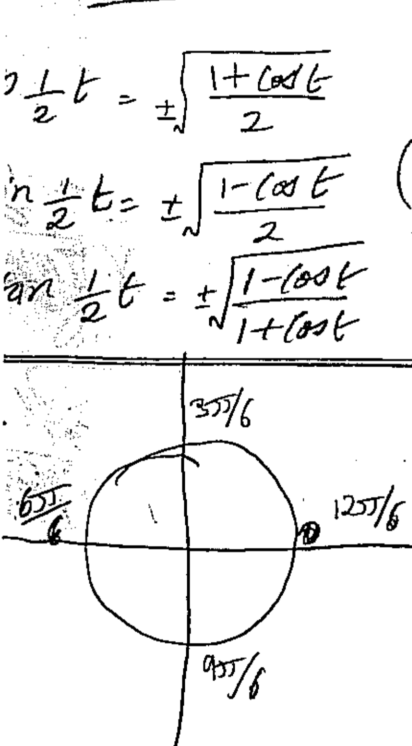
The +ive or -ive sign will be determined by what quadrant the graph falls in

eg: $\sin\frac{1}{2}(420°) = \sin 210° =$ IIIrd quad & so -ive

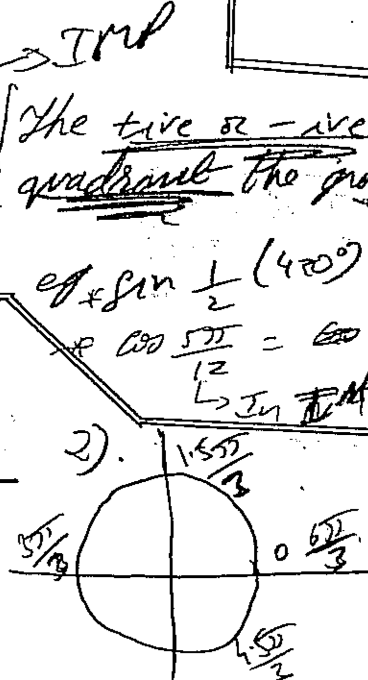
e $\cos\frac{5\pi}{12} = \cos\frac{1}{2}\left(\frac{5\pi}{6}\right)$

→ In Ist quad. & so +ive

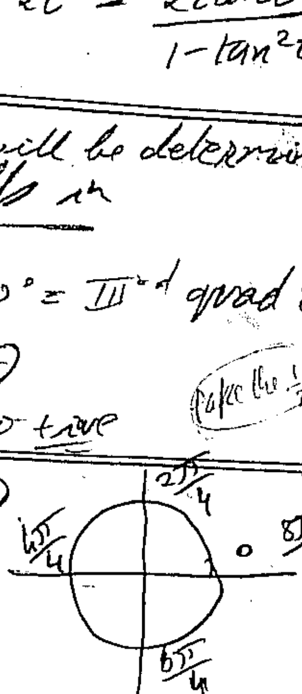
take the $\frac{1}{2}$

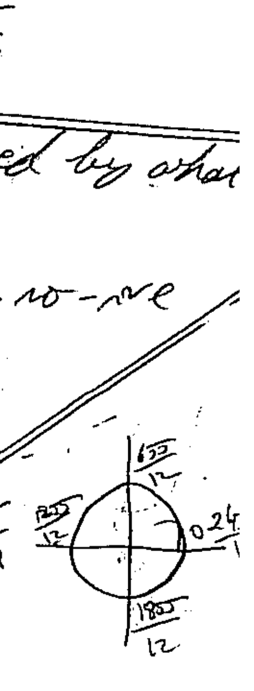


2).



3)





From jolang Tue May 26 16:02 EDT 1992
From: hlwpj!jolang (Joan H Lang +1 908 949 0286)
To: hlwpj!diane, hlwpj!jolang, hlwpj!vsh, homxb!fine, homxb!jtupino, homxb!khm, homxb!norris, homxb!pav, homxb!sgbali, homxb!tlr, homxc!darla, hostar!kpd, hostar!march
Cc: attmail!nshaer (Norman R Shaer), mtdcc!vbl (Victor B Lawrence)
Subject: Friday, May 29
Status: RO

Following is the tentative agenda for the meeting on May 29, 1992 with Norm Shaer at 9 a.m.

9 am to 10:30 am - QUEST presentation by N. Shaer
10:30 am to 11:00 am - Brief overview of projects by Shri and Tom with descriptions by

Marc Hornby - Performance Support for TCC NESAC
and
Jim Tupino - ISDN Videophone Technical Trial

The meeting is in Room 3N-418. Immediately following the meeting, we will leave for the boat ride/luncheon in Atlantic Highlands.

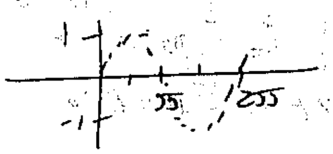
Joan Lang
hlwpj!jolang

IMP INVERSE TRIG FUN

* $f(x) = \sin x \rightarrow$ periodic funct.
$f(x) = \sin x \rightarrow$ Restricted Domain & Invertible

* $f(x) = \cos x \rightarrow$ periodic
$f(x) = \cos x \rightarrow$ Rest. Domain & Invertible.

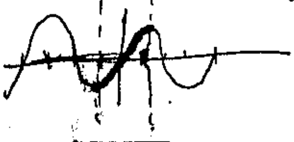
* $f(x) = \sin x$



$\rightarrow$ Not Invertible. IMP
Does not pass the HORIZONTAL LINE TEST.

* $f^{-1}(x) = \cos^{-1} x = \arccos x$

* Defn: Arcsin funct. is denoted by $y = \arcsin x$ or $y = \sin^{-1}$
if $D = [\frac{-\pi}{2}, \frac{\pi}{2}]$ or $\boxed{\frac{-\pi}{2} \le x < \frac{\pi}{2}}$ or in quad I & IV IMP
$\rightarrow$ IMP



* Defn: Arccos is denoted by $y = \arccos x$ or $y = \cos^{-1} x$ iff $x = \cos y$ where $\boxed{0 \le y < \pi}$ which is quad I & II IMP
$\rightarrow$ IMP

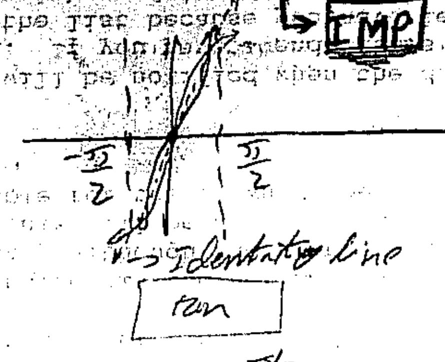
IMP

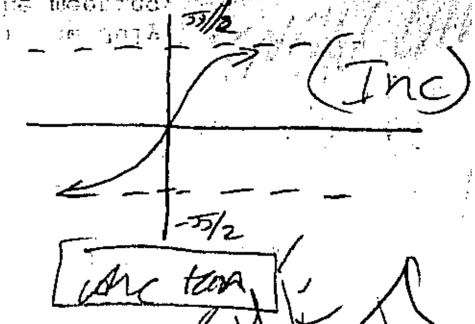
Defn: $\boxed{\text{Arctan}}$ funct. is denoted by Arctan $x = y$ or $\tan^{-1} x = y$ iff $\tan y = x$ where $\boxed{-\frac{\pi}{2} < y < \frac{\pi}{2}}$ in quad I & IV. } $\boxed{\text{IMP}}$

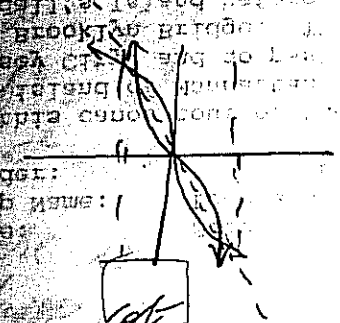
$\boxed{\text{IMP}}$

$f(\tan) = \tan(x)$

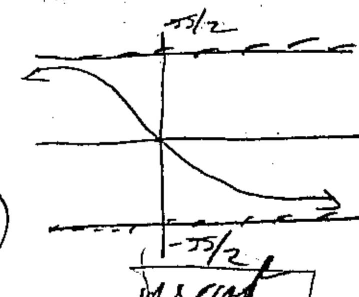
$D = \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$







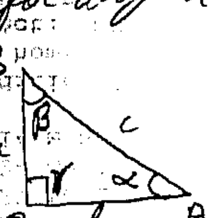
(Dec)



MIND THE QUADRANTS

Treat Arcsec & Arccosec as Arccos & Arcsin respectively. $\boxed{\text{IMP}}$

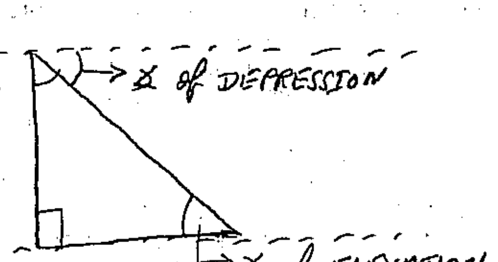
for any inverse funct. quad. III is not at all needed.



$\sin\alpha = \frac{a}{c}$ $\csc\alpha = c/a$

$\cos\alpha = \frac{b}{c}$ $\sec\alpha = c/b$

$\tan\alpha = \frac{a}{b}$ $\cot\alpha = b/a$



Line of sight to the object = ∡ of depression

Guy wire → Hypotenuse.

$\boxed{\text{LAW OF SINES}}$ can be used for ANY TYPE OF A TRIANGLE

when 2 ∡ and any side of a Δ are given, they always yield a unique Δ

when 2 sides and a ∡ opposite is given, then it yields an AMBIGUOUS CASE

$$\boxed{\frac{\sin\alpha}{a} = \frac{\sin\beta}{b} = \frac{\sin\gamma}{c}} \Big\} \boxed{\text{IMP}}$$

* Given two sides and a $\angle$ opposite the sides. There are 3 possibilities of a Δ → 1 Δ, 2 Δ or no Δ

* LAW OF COSINES → is used when –
1) 2 sides and an included $\angle$ are given.
2) 3 sides are given.

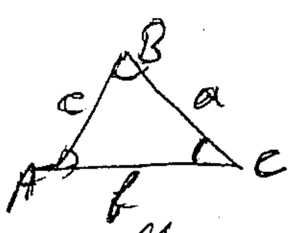
KNOW LAW OF SINES & COSINES

$a^2 = b^2 + c^2 - 2bc \cdot \cos\alpha$
$b^2 = a^2 + c^2 - 2ac \cdot \cos\beta$
$c^2 = a^2 + b^2 - 2ab \cdot \cos\gamma$

V.V.V. IMP

There is no ambiguous case in law of cosines & will always generate ~~an~~ a Δ.

HERON'S FORMULA →



area $\Delta = \frac{1}{2}$ b × alt
Peri $\Delta = a + b + c$

or $\boxed{\text{area of a } \Delta = \sqrt{s(s-a)(s-b)(s-c)} \quad \text{where } s = \frac{a+b+c}{2}}$

V.V.V IMP

POLAR COORDINATES

In this system, center is the pole based upon the ordered pair (r, θ).
Polar axis → starting axis or 0°.
r → Radius & θ = $\angle$ of rotation from the initial ray to the terminal ray.

IF THERE IS A NEGATIVE RADIUS THEN →
$(-r, \theta) \Rightarrow (|r|, \theta \pm 180°)$ → IMP
If the θ rotation is counterclockwise then add 180° otherwise subtract 180°. → IMP. ie Increase θ by 180° / Decrease

From arch3!jb4 Fri Jun 5 15:59 EDT 1992
To: jb4, hlwpj!vsh, homxb!sgbali, homxc!lagan, hostar!kpd, hostar!march, mtfmi!mal, mtgzy!erk, mtsol!jcp, mtunp!jim, uhura!lin
Subject: DynaText Demonstration
Status: RO

To: Online Documentation Standards Members
Re: DynaText Demo in Holmdel

A demonstration of the DynaText product is scheduled for:

Friday June 19, 1992
Holmdel Room 1E-332
1:30 to 4:30

The demonstration will be led by a representative from DynaText.

If you plan to attend, please let me know so that I can be sure that the arrangements are adequate. If you have any questions, please give me a call.

Thanks.
John Baldasare
arch3!jb4
908-949-6205

* Rectangular to Polar Coordin

$(x,y) = (r,\theta)$

$(3,4) = (r,\theta)$

$9+16 = r^2$

$r^2 = 25$

$r = \pm 5 = \underline{5}$

$\therefore (5, 53$

$\tan\theta = \frac{4}{3}$

$\theta = \tan^{-1}\frac{4}{3} = 53.1$

* Polar to Rectangular Coordinate

$(4, 60^\circ) \Rightarrow \sin 60^\circ = \frac{y}{4}$

$\therefore y = 2\sqrt{3}$

$\cos 60^\circ = \frac{x}{4}$

$x = 2$

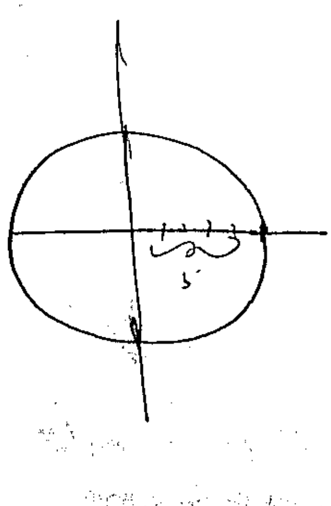
$\therefore \boxed{(2, 2\sqrt{3})}$

V.V.V.
IMP

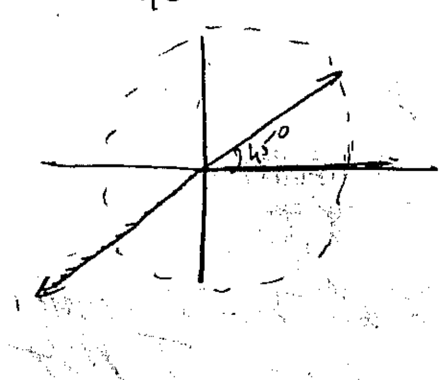
* IN FINDING THE θ MAKE SURE THE ANGLE IS IN THE CORRECT QUADRANT OR HAS THE PROPER SIGN

IMP

* $r = 5$



* $\theta = 45^\circ$



A polar eq in the form $r = n\cos\theta$ will give a circle tangent to pole

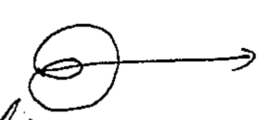
A polar eq in the form $r = n\sin\theta$ will give a circle tangent to pole

$r = n\cos\theta$ $\left\{\begin{array}{l} \text{'n'} \to \text{is the diameter of the circle.} \\ +\text{ive } n \to \text{to the right} \\ -\text{ive } n \to \text{to the left.} \end{array}\right\}$

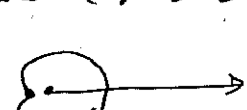
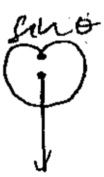
$r = n\sin\theta$ $\left\{\begin{array}{l} \text{'n' is the diameter of the circle.} \\ +\text{ive } n \to \text{to the top} \\ -\text{ive } n \to \text{to the bottom} \end{array}\right\}$

$\left.\begin{array}{l} r = a \pm b\cos\theta \\ r = a \pm b\sin\theta \end{array}\right\}$ Limecons.

If $a < b$, then an extra loop is formed.

eg $r = 2+3\cos\theta$  $r = 2+3\sin\theta$ 

If $a > b$, then the indentation moves off pole.

eg $r = 3+2\cos\theta$  $r = 3+2\sin\theta$ 

$\left.\begin{array}{l} r = a\cos n\theta \\ r = a\sin n\theta \end{array}\right\}$ ROSE TYPE

If 'n' is odd, then have 'n' petals.

If 'n' is even then have '2n' petals.

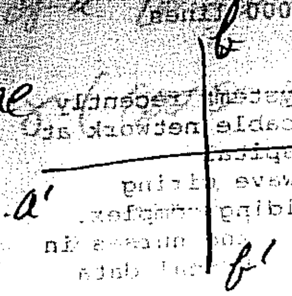
'a' is the length of the petals.

cosines will be in plus shape.

Sines will be in multiplication shape.

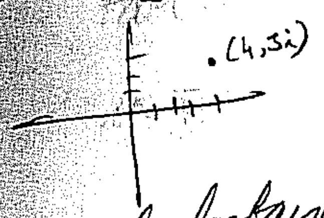
* A complex # is shown in the form of $a+bi = z$ (bi → pure imaginary; a → Real no.)

* Complex plane



$i = \sqrt{-1}$

* $4+3i = z$



$\boxed{\text{b is THE COEFFICIENT OF } i}$ → IMP

To find distance from origin to complex pt.

$$|z| = \sqrt{a^2+b^2} \Big\} \text{IMP}$$

$z_1 = 5+2i$; $z_2 = \sqrt{3} - i$

$|z_1| = \sqrt{25+4} = \sqrt{29}$ → 2.8 not $\sqrt{21}$ because 'b' is the coefficient of i

$|z_2| = \sqrt{3+1} = \sqrt{4} = 2$

* $|z_1 \cdot z_2| = |z_1| \cdot |z_2| = \sqrt{29} \cdot 2 = 2\sqrt{29}$

* $\left|\frac{z_1}{z_2}\right| = \frac{|z_1|}{|z_2|} = \frac{\sqrt{29}}{2}$

* $|3z_1 - 2z_2|$

$= |3(2+7i) - 2(5-2i)|$

$= |6+21i-10+4i|$

$= |-4+25i|$

$= \sqrt{16+625} = \sqrt{641}$

$z = a + bi$

Polar form of a Complex System

$z = r(\cos\theta + i\sin\theta) \rightarrow$ Polar Form

* $z = -\sqrt{3} + i \rightarrow$ IInd quad.

$r = 2$

$\tan\theta = \frac{1}{\sqrt{3}} \Rightarrow \theta = \tan^{-1}\frac{1}{\sqrt{3}} \Rightarrow \theta = 30° = $ ref $\angle$

in IInd quad $= 180 - 30 = \underline{150°}$

$\therefore 2(\cos 150° + i\sin 150°)$

* $2(\cos 150° + i\sin 150°)$

$2\left(-\frac{\sqrt{3}}{2} + i\frac{1}{2}\right)$

$= -\sqrt{3} + i \rightarrow$ RECTANGULAR FORM

* Given polar forms of complex no., to multiply or divide use

$$\left.\begin{aligned} z_1 \cdot z_2 &= r_1 \times r_2\left[\cos(\theta_1+\theta_2) + i\sin(\theta_1+\theta_2)\right] \\ z_1/z_2 &= r_1/r_2\left[\cos(\theta_1-\theta_2) + i\sin(\theta_1-\theta_2)\right] \end{aligned}\right\} \text{IMP}$$

* DE MOIVRE'S THEOREM:

$$z^n = r^n(\cos n\theta + i\sin n\theta)$$

* HAVE TO HAVE POLAR FORM TO USE DE MOIVRE'S THEOREM.

* To find the nth roots of a complex form.

* $$\boxed{\sqrt[n]{r}\left[\cos\frac{1}{n}(\theta + k\cdot 360°) + i\sin\frac{1}{n}(\theta + k\cdot 360°)\right]} \quad \text{V.V. IMP}$$

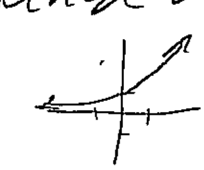
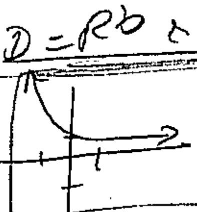
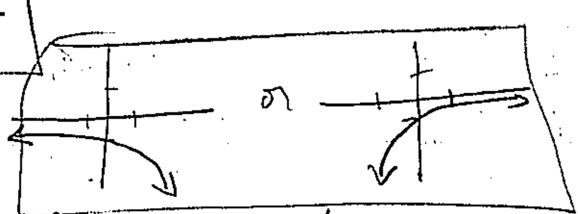
* $k = n - 1$

* Substitute in the values of k.

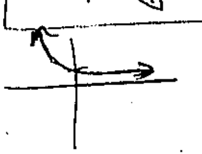
LOGARITHMS

log functions are transcendental functions

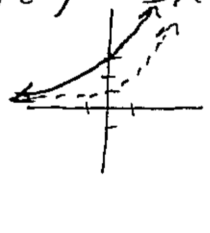
* $(x^4)^4 = x^{16}$	* $x^{15} \cdot x^6 = x^{21}$	* $\frac{x^{11}}{x^4} = x^7$	* $\frac{x^5}{x^9} = \frac{1}{x^4} = x^{-4}$
* $\left(\frac{x^{-8}}{y^{-3}}\right) \frac{y^6}{x^{16}}$	* $-4^{1/2} = -\sqrt{4} = -2$	* $16^{\frac{1}{2}} = \sqrt{16} = 4$	* $36^{-1/2} = \frac{1}{\sqrt{36}} = \frac{1}{6}$
* $(-4)^{1/2} = \sqrt{-4} = $ undef	* $(-8)^{1/3} = \sqrt[3]{-8} = -2$	*	

* CAN TAKE THE ODD ROOT OF A NEGATIVE NUMBER.
* For each Real no. $a > 1$, if $f(x) = a^x$ defines an exponential funct. whose domain is the set of R's & Range is $(0, \infty)$.
* If $0 < a < 1$ then $f(x) = a^x$ is defined as $f(x) = \frac{1}{a}^{-x}$
* If $a > 1$ then $D = R's$ & $R = (0, \infty)$  → Increasing
* If $0 < a < 1$, then 
* If $a < 0$ then → 

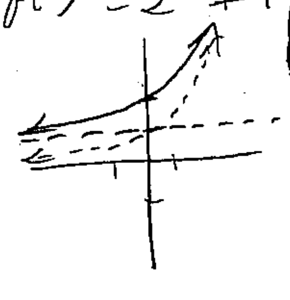
EXPONENTIAL F

* $f(x) = 2^{-x} = \left(\frac{1}{2}\right)^x$ →  → decreasing

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

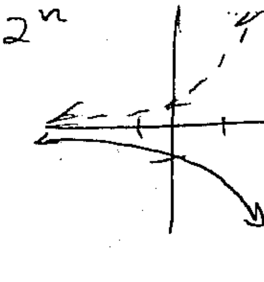


* $f(x) = 2^x + 1$

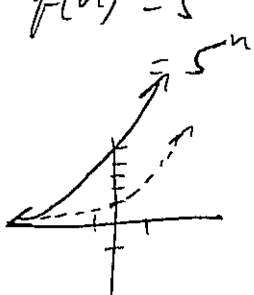


IMP RANGE CHANGES when we ADD or SUBSTRACT a CONSTANT.

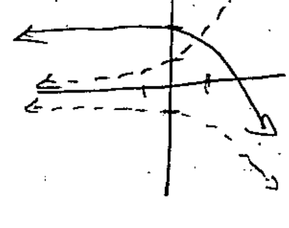
* $f(x) = -2^x$



* $f(x) = 5^{-x+1}$
$= 5^x \cdot 5$ → ?



* $f(x) = 3 - 4^x$



EXPONENTIAL FUNC

V.V.V. IMP

is being done to re-code inspect it. a. What is your definition of "Golden Code"? b. How much of your total code is "golden?" c. How do you propose to "reinspect" or "walk-through" this Golden Code? d. How much will it cost to do this reinspection?

Reports By: a. 2STP - Mike Kefauver b. 5ESS - Nancy Chapdelaine c. 4ESS - Jim Foster d. 1NCP - Jack Rettig

Those persons participating on the conference call in CB and Bedminster should agree among yourselves where to originate the call from. One port per location.

Joanne Jamrok NSD CBU Quality Manager IHC 1G-331 (708)713-5648

---

* base $\boxed{e}$ is an $\boxed{\text{irrational \#}}$

* Exponential & log functions are inverse functions I

* Logs in $\boxed{\text{base } 10}$ are called $\boxed{\text{COMMON LOGS}}$

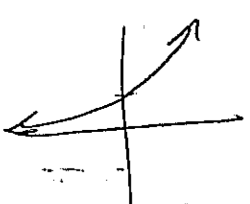
* Logs in $\boxed{\text{base } e}$ are called $\boxed{\text{NATURAL LOGS.}}$

* $\boxed{f(x) = e^x}$ y int = (0,1) V.V.V. IMP

D = R H.A = y=0

R = $(0, \infty)$

Inc.



* $\boxed{e^1 = 2.7182818\cdots \Rightarrow \text{EULER'S \#}}$ IMP

$e^2 = 7.4$ $e^{2.3} = 10.0$ $e^{-2.3} = 0.1$

$e^{-3} = 0.05$ $e^{\sqrt{3}} = 5.7$

* Base → to $\boxed{\text{tenths place.}}$

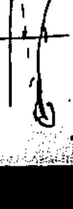
Power → to $\boxed{\text{the 4}^{th}\text{ place.}}$

* Log phase is equal to the exponent. It is the inverse exponent func. IMP

$\boxed{\log_a y = x \Rightarrow a^x = y}$

* Log func. has a verticle asymptote & no $\boxed{\text{Domain}}$ = V. → IMP

* $\boxed{\log_4(2x-1)}$ $\boxed{\begin{matrix} 2x-1>0 \\ x>\frac{1}{2} \end{matrix}}$ V.V.V. IMP V.V.V IMP



$\log (x^2-4)$

$x^2-4>0$

$x^2>4$

$x> \pm 2$

$\log_x |x| = g(x)$

$x>0$ $x>0$ $D = \{R\text{'s but } 0\}$

$x>0$ $x<0$

A WHOLE # BASE → IMP

$\log y = x$

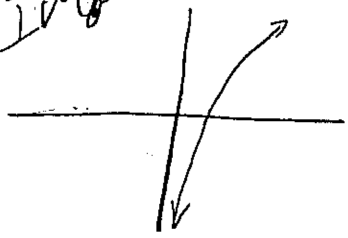
$D = (0,\infty)$

x int $= (1,0)$

V.A. $= x=0$

$R = R\text{'s}$

$\boxed{\text{INC}}$



$\boxed{\text{V.V.V IMP}}$

* A DECIMAL BASE → IMP

$D = (0,\infty)$

$R = R\text{'s}$

$(1,0)$

V.A. $= x=0$

dec = base of 1/7

Common logs have a base of 10

$\log_{10} 496 = 2.6955$

antilog → $10^{2.6955} = 496$

Natural logs have a base of e

$\ln 38 = x$ $\qquad \ln 38 = 3.6376$

$e^x = 38$ $\qquad \left\{ \begin{array}{l} e^x = 38 \\ e^{3.6376} = 38 \end{array} \right\}$ IMP $\boxed{\text{V.V.V. IMP}}$

log phrases are exponents.

1). $\log_a xy = \log_a x + \log_a y$

2). $\log_a \frac{x}{y} = \log_a x - \log_a y$

3). $\log_a x^t = t \log_a x$

$\boxed{\text{IMP}}$

From homxb!sgbali Mon Apr 13 16:58 EDT 1992 From: homxb!sgbali (Shri G Bali +1 908 949 0281) To: hlwpj!jolang Subject: printing Status: RO

>From att!attmail!dauer Mon Apr 13 13:16:40 GMT 1992 Message-Version: 2 >To: attbl!homxb!sgbali Date: Mon Apr 13 08:19:25 CDT 1992 From: attmail!dauer (David Louis Auer) Received: from dauer by attmail; Mon Apr 13 13:15:43 GMT 1992 MTS-Message-ID: <dauer1041315490> UA-Content-ID: <ATT-2.04-dauer-0000000000-222> End-of-Header: EMail-Version: 2 Phone: 708-224-6844 Fax-Phone: +1 708 224 4583 Subject: AMD QIT CONF. CALL UA-Message-ID: <ATT-2.04-dauer-0000000000-222> To: attmail!attbl!wrddo!kmt To: attmail!attbl!ihlpf!rrush To: attmail!attbl!homxb!kpd To: attmail!attbl!homxb!sgbali To: attmail!lvick (Lowell Vick) To: attmail!dauer (David Louis Auer) To: attmail!hlwatson (Harold L Watson) To: attmail!bnroy (Bentley E Roy) To: attmail!vathompson (Valerie Ann Thompson) To: attmail!attbl!swsigdiv!wdr To: attmail!cfrost (Clayton W Frost) To: attmail!nesac2!bds To: attmail!butz (Jerry D Butz) End-of-Protocol: Content-Type: Text Content-Length: 387 Status: RO

The Tuesday April 14 AMD QIT meeting has been rescheduled due to a managers conference in Bedminster. The rescheduled conference call will be held on 4/20 (Monday) from 2-4 P.M. EST to review AMD trial status. This call should not take the full 2 hours. If anyone is in Denver we will be in conference room G1.

The alliance meet me bridge # is 0-700-452-2634. Jerry Boudreau/Dave Auer

* CANNOT TAKE THE LOG OF A NEGATIVE NUMBER } IMP
* take Antilog wherever necessary.
* CHANGE OF BASE RULE

$\log_3 7 = n \Rightarrow 3^n = 7$

$n \log 3 = \log 7 \Rightarrow n = \frac{\log 7}{\log 3}$

* a). $\log_a b = \log b / \log a$ → IMP IMP

  1). $\log_3 7 = \log 7 / \log 3 = 1.7712$

* USE COMMON OR NATURAL logs appropriately wherever necessary

* MANTISSA → # greater than 0 & less than one

CHARACTERISTIC → whole #

* Mantissa is always POSITIVE. } IMP

$10^{0.5775+2} = 10^{0.5775} \times 10^2$

$= 3.78 \times 10^2 = 378$

SEQUENCES

Sequence – a pattern of numbers where the domain is fixed and the range is generated from the given sequence formula.

* a_n → 'n' is the no. of terms.
* $a_n = \{a_n\} = \{f(n) = \frac{1}{n}\}$
* There are Arithmetic & Geometric Sequences.
* ARITHMETIC SEQUENCE OR PROGRESSION

If each term after the 1st term differs from the preceding terms by a fixed number.

$$\boxed{a_n = a_1 + (n-1)d} \Big\} \text{IMP}$$

d = Common difference { ~~first~~ second term – first term }

* GEOMETRIC PROGRESSION → where each term after the 1st term is formed by multiplying the preceding term by a fixed no.

$$\boxed{a_n = a_1 \cdot r^{n-1}} \Big\} \to \text{IMP.}$$

* r = Common ratio { the ratio of the second term over the first term }

Sum of an infinite sequence is called a series.
The compact form uses Sigma Notation.

$$\boxed{\sum_{k=1}^{n} (2k+3)}$$

'n' → INDEX OF SUMMATION

$k=1$ → STARTING INTIGER

* $\sum_{k=1}^{6}(3k-4)$ → compact form of the series (sum)

* $[3(1)-4]+[3(2)-4]+[3(3)-4]+\dots+[3(6)-4]$ → Expanded form

* $-1+2+5+8+11+14$ → series form

* 39 → sum

* SIGMA NOTATION ALWAYS REPRESENTS SUMMATION.

* PROPERTIES OF SUMMATION

1) Constant Property → $\sum_{k=1}^{n} c = \boxed{nc}$

2) Homogenous Property → $\sum_{k=1}^{n} ca_k = \boxed{c\sum_{k=1}^{n} a_k}$

3) Additive Property →

$$\sum_{k=1}^{n}(a_k+b_k) = \boxed{\sum_{k=1}^{n} a_k + \sum_{k=1}^{n} b_k}$$

4) Sum of successive Integers →

$$\sum_{k=1}^{n} k = \boxed{\frac{n(n+1)}{2}}$$

5) Sum of successive squares →

$$\sum_{k=1}^{n} k^2 = \boxed{\frac{n(n+1)(2n+1)}{6}}$$

IMP

* TO USE THE PROPERTIES OF SUMMATION, THE 'k' VALUE SHOULD ALWAYS START FROM 'ONE' → $\boxed{\text{MOST IMP}}$.

* Sum of A.P. → $S_n = \frac{n}{2}[2a_1+(n-1)d]$

$S_n = \frac{n}{2}(a_1+a_n)$ IMP

* SUM OF GP $\rightarrow S_n = \dfrac{a_1(1-r^n)}{1-r}$ (where $r \neq 1$) IMP

SUM OF INFINITE SERIES $\rightarrow S_n = \dfrac{a_1}{1-r}$ (where $|r| < 1$) $\rightarrow$ IMP

$0.\bar{3} = 0.3 + 0.03 + 0.003 + \ldots$

$a_1 = 0.3$

$r = 0.1$ or $1/10$

$S_n = \dfrac{\frac{3}{10}}{1-\frac{1}{10}} = \dfrac{3}{9} = \dfrac{1}{3}$

or $10n = 3.\bar{3}$

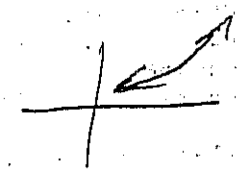
$n = 0.\bar{3}$

$9n = 3.0$

$n = \dfrac{3}{9} = \dfrac{1}{3}$

$\sum_{k=1}^{\infty} 2^k$ $\quad 2+4+8+16+32+\ldots$

$r = 2 \rightarrow$ Ratio is greater than one



DIVERGENT SUM

* FACTORIAL NOTATION

$n!$ is defined for all non-negative Integers.

$0! = 1 \rightarrow$ IMP

$n! = n(n-1)(n-2)(n-3)\ldots$

* COMBINATION NOTATION –

k & n are Ip such that $0 \le k \le n$

then $\dbinom{n}{k} = \dfrac{n!}{k!(n-k)!}$ IMP

$a_n = a_1 + (n-1)d$

$S_n = \frac{n}{2}[2a_1 + (n-1)d]$

$\frac{n}{2}[a_1 + a_n]$

Constant $\sum_{k=1}^{n} C = nC$

Homogenous $\sum_{k=1}^{n} C a_k = C \sum_{k=1}^{n} a_k$

* $a_n = a_1 \cdot r^{n-1}$

$S_n = \frac{a_1(1-r^n)}{1-r} \rightarrow r \neq 1$

Additive $\sum_{k=1}^{n} (a_k + b_k) =$

$\sum_{k=1}^{n} a_k + \sum_{k=1}^{n} b_k$

* $S_n = \frac{a_1}{1-r}$ where $|r| < 1$

Success. Int $\rightarrow \sum_{k=1}^{n} k$

$\frac{n(n+1)}{2}$

* $\binom{n}{k} = \frac{n!}{k!(n-k)!}$

* $0! = 1$

Success Square $= \sum_{k=1}^{n} k^2$

$\frac{n(n+1)(2n+1)}{6}$

* BINOMIAL EXPANSION $\rightarrow$

$(a+b)^n = \binom{n}{0} a^n + \binom{n}{1} a^{n-1} b + \binom{n}{2} a^{n-2} b^2 + \binom{n}{3} a^{n-3} b^3 + \dots + \binom{n}{n} b^n$

* $\sum_{k=0}^{n} \binom{n}{k} a^{n-k} b^k$

to find a particular term of the binomial expansion

* $\binom{\text{power}}{\text{term}-1} (\ )^{\text{diff. between power \& (term-1)}} (\ )^{(\text{term}-1)} \rightarrow$ V.V. IMP

* $(2x-y)^8 \rightarrow 6^{th}$ term

$\binom{8}{6-1} (2x)^3 (-y)^5 \Rightarrow -448x^3y^5$

From arch3!jb4 Thu Jun 4 10:10 EDT 1992
To: alfalfa!cec, arch1!lhh, arch2!dnn, bct, deronda, jb4, lbb,
attmail!ckhoffman, attmail!ebron, attmail!joanneb, attmail!laffey,
attmail!mcarey, attmail!middaugh, attmail!trohalides, attmail!wfish,
attme!alkab, drddol!mary, druks!ouray, druks!wolpert, fjtlc!allenb,
homxb!sgbali, homxc!lagan, hoqax!acj, hostar!kpd, ihlpw!straka,
ihlpy!napatch, indycic!djr, indycic!gil, mtdcb!pdn!j.new,
mtdcb!pdn!k.fitzgerald, mtfme!lmk, mtfme!tml, mtfmi!mal, mtgzy!erk,
mtunp!jim, mtunp!nee, mtuxo!llhl, nwwpa!wjb, techman!trb, uhura!lin,
uhura!nam, violin!gpp, wrddo!cnile, wrddo!lgj
Subject: DynaText Demo
Status: RO

To: Online Documentation Standards Members
Re: DynaText Demo in Holmdel

A demonstration of the DynaText product is scheduled for:

Friday June 19, 1992
Holmdel Room 1E-332
1:30 to 4:30

The demonstration will be led by a representative from DynaText.

If you plan to attend, please let me know so that I can be sure that the arrangements are adequate. If you have any questions, please give me a call.

Thanks.
John Baldasare
arch3!jb4
908-949-6205

* $(n+\sqrt{a})^{12}$, middle term
from 0 to 12, the middle term a

$\binom{12}{6}(n)^6(\sqrt{a})^6$

$= 924\, n^6 a^3$

* NO MIDDLE TERM FOR ODD Pow

JM

CONICS

Circle: the set of points a fixed distance from a given point (center)

standard form of a circle at origin $= x^2+y^2=r^2$

std form of a circle off the origin $= \boxed{(x-h)^2+(y-k)^2=r^2}$

center $-(h,k)$ & Radius $=r$

In a circle the two quadratic variables are added & their numerical coefficients are the same.

distance formula: $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

midpoint formula $= \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

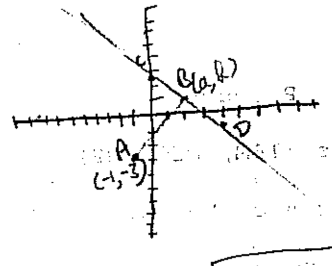
slope formula: $\frac{Y_2-Y_1}{X_2-X_1}$ & $\frac{\text{rise}}{\text{run}}$ or $\frac{\sqrt{\text{what's under } y}}{\sqrt{\text{what's under } x}}$ } IMP

$C=(-1,-3)$ & tangent to $3x+4y=10$

$3x+4y=10$

$\therefore y=-\frac{3}{4}x+\frac{5}{2}$

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



slope of $\overline{AB}=\frac{-3-b}{-1-a}$

slope of $\overline{CD}=-\frac{3}{4}$ $\Rightarrow \frac{-3-b}{-1-a}=\frac{4}{3}$ (opposite reciprocal) → IMP

$-9-3b=-4-4a$

$4a-3b=5$

$\Rightarrow 3(4a-3b=5)$
$4(3a+4b=10)$

$\Rightarrow 12a-9b=15$
$12a\pm16b=40$
$-25b=-25$
$b=1$

$(2,1)$

$4a-3=5$
$a=2$

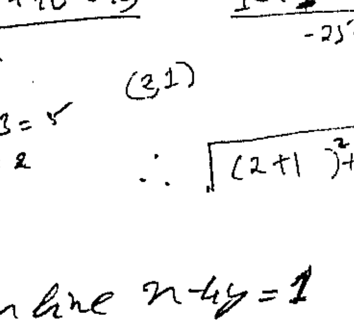
$\therefore \sqrt{(2+1)^2+(1+3)^2}=\sqrt{9+16}=\sqrt{25}=5$

$\therefore$ eq $=\boxed{(x+1)^2+(y+3)^2=25}$

contains pt $(3,7)$ & $(5,5)$ & center on line $x-4y=1$

$x-4y=1$

$y=\frac{x}{4}-\frac{1}{4}$



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

$(3-h)^2+(7-k)^2=r^2$

$(5-h)^2+(5-k)^2=r^2$

$=9-6h+h^2+49-14k+k^2=r^2$

$\underline{25\mp10h+h^2\pm25\mp10k\pm k^2=r^2}$

$-16+4h+24-4k=0$

$\Rightarrow 4h-4k=-8$

$4(h-k)=-8$

$h-k=-2$

$\Rightarrow h-k=-2$
$\underline{h-4k=1}$
$3k=-3$
$k=-1$

$h+1=-2$

$h=-3$ $(-1,-3)$

$\sqrt{64+36}=\sqrt{100}=10$

$(x+3)^2+(y+1)^2=10$

From arch3!oca Fri Jun 5 17:37 EDT 1992
To: arch3!oca
Subject: competitive briefing next week
Status: RO

Reminder: The AT&T Architecture Area will be reviewing the technical and architectural directions of AT&T's competitors.

This briefing will be repeated in four locations from 9:00am to 12Noon as follows:

June 9 - Holmdel 5E-201 (mini-auditorium)
June 10 - Bedminster Auditorium
June 11 - Dayton (NCR Sugarcamp)
June 12 - Indian Hill Auditorium

No reservations are required, but only AT&T employees may attend.

The briefing will be divided into two parts. The agenda is:

Part 1 - 9:00am to 10:15 - Telecommunications Products & Services

Subject	Example Vendors
Networking Products Vendors	Alcatel, Northern Telecom
Inter-exchange carriers	MCI, Sprint
RHCs / AAVs	US West, MFS
Global Carriers & PTOs	BT, C&W, Sprintnet
Wireless	Motorola, McCaw
Video Telephony	PictureTel

Part 2 - 10:30 to 11:30 - Computer Products

Major Domestic Competitors (IBM, DEC, HP)
The Japanese Computer Industry
Application and Networking Architectures (SAA/SNA, OCCA, ...)
Fault-Tolerant Systems
Industry Directions, Trends and Strategies

* ELLIPSE -> set of all pts. where the sum of the distances from 2 fixed pts (foci) is constant.
* Gen eq -> $\boxed{\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1}$
* Center = (h, k)
* MAJOR AXIS -> ABOVE THE GREATER DENOMINATOR.
* Endpoints of the Major axis = $\boxed{\sqrt{\text{GREATER DENOMINATOR}}}$

V. V. V. IMP

* Length of the major axis is = $\boxed{2 \times \text{ENDPOINT}}$.
* $\boxed{\text{FOCUS} = C \Rightarrow C^2 = a^2 - b^2}$ IMP
  L> BIGGER DENOMINATOR
* a^2 is always the bigger denominator.
* THE FOCI ALWAYS LIE ON THE MAJOR AXIS.
* IN ELLIPSE BOTH THE QUADRATIC VARIABLES ARE ADDED
* IN ELLIPSE THE NUMERICAL COEFFICIENTS OF THE ~~VAR~~ QUADRATIC VARIABLES ARE DIFFE
* FOCAL CORD -> Segment ⊥ to the major axis & passes through the foci (mid pt. of the co
* $\boxed{F.C = 2b^2/a}$ IMP

LEARN THE "COMPLETING THE SQUARE" METHOD.

$a \rightarrow$ is the distance from the center to the endpt. of the major axis.

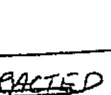
$c \rightarrow$ is the distance from the center to the foci.

HYPERBOLAS $\rightarrow$ set of all pts where the difference between the distance of two fixed pts (foci) is constant.

$$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1 \text{ or } \frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$$

$\boxed{a^2}$ always lies under the $\boxed{+ive}$ variable. $\rightarrow$ IMP

+ive x^2 term will sketch the graph left & right.

−ive x^2 term will sketch the graph up & down. 

TRANSVERSE AXIS $\rightarrow$ is always with the +ive denominator or a^2.

center (h, k)

$\boxed{\text{foci} = c^2 = a^2 + b^2}$ ↳ +ive denom.

IN HYPERBOLA BOTH THE QUADRATIC VARIABLES ARE $\boxed{\text{SUBTRACTED}}$.

the numerical coefficients do not matter

Focal cord = $\boxed{\frac{2b^2}{a}}$

EQUATION OF A LINE OR $\boxed{\text{ASYMPTODE}}$ = $y = \pm \overset{\text{SLOPE}}{m}x$ } IMP

PARABOLAS $\rightarrow$ a set of pts. formed when the distance from a point on the curve to a fixed pt (focus) is the same as the distance from the pt (P) to a fixed line (directrix).

$(x-h)^2 = \pm \boxed{4c}(y-k) \rightarrow$ opens $\boxed{\text{up or down}}$

$(y-k)^2 = \pm \boxed{4c}(x-h) \rightarrow$ opens $\boxed{\text{left or right}}$. IMP

$\boxed{c}$ is the $\boxed{\text{distance from the vertex}}$ (center) to the focus & then to the directrix.

Focus cord = $\boxed{|4c|}$; $\boxed{\text{Focus} = c}$

Equation must be solved for the QUADRATIC VARIABLE with a coefficient of +ive one

AXIS OF SYMMETRY IS $\perp$ TO THE DIRECTRIX.

From pav Wed Jun 3 14:51 EDT 1992
From: hoqax!pav (Paul Vasilopoulos +1 908 949 0278)
To: attmail!crysel (Cheryl K Crysel), attmail!swientek (Christine A Swientek),
attmail!dmckay (David G Mckay),
attmail!dstevenson (Donald L Stevenson, Jr),
attmail!dethomas (Dwight E Thomas, Jr), attmail!gmayer (Gary A Mayer),
attmail!gnunnally (Glyn D Nunnally), attmail!gmharris (Gloria M Harris),
attmail!jneal (James A Neal), mvgpk!mvjc8 (James M Crowley),
attmail!jjfinnegan (John J Finnegan),
attmail!kdunnahoo (Lillian K Dunnahoo), attmail!luciej (Lucie M Johnson),
attmail!mewalker (Marsha E Walker), attmail!msell (Mary L Sell),
attmail!nmcgrath (Nancy L Mcgrath), attmail!pfennell (Patricia E Fennell),
homxb!pav (Paul Vasilopoulos), attmail!kaissling (Ronald C Kaissling),
attmail!rjrichter (Robert J Richter), attmail!rsayers (Ronald S Ayers),
homxb!sgbali (Shri G Bali), attmail!tmallory (Teri M Mcmahon),
hlwpj!vsh (Victoria S Hiering), attmail!wnoles (Wilbur R Noles),
so043b!wtb (William T Barr), attmail!wbradford (Willene B Bradford)
Subject: Motorola
Status: RO

The Motorola benchmarking visit has been registered with Continental, Northwest, Delta, and United. America West does not register AT&T meetings (at least according to AMerican Express Travel).

The name given to the meeting was Motorola Benchmarking, and Shri Bali is the point of contact for the airlines.

Paul

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* TRANSLATION OF AXIS → Creates a new coordinate system where (h,k) becomes the new origin system called the $\bar{x}\bar{y}$ system.

$$x^2 = 8y \Rightarrow \bar{x}^2 = 8\bar{y}$$

* $\left.\begin{array}{l}\bar{x} = x-h \\ \bar{y} = y-k\end{array}\right\}$ IMP

* Conic sect → any curve obtained from the intersection of double napped cones & a plane.
* Double napped cones are Right circular cones.
* Plane parallel to the base of a cone gives a circle.
* Plane ~~p~~ intersecting a cone at an ∡ gives an ellipse.
* Plane ⊥ bases & passes through both ends gives a hyperbola.
* Plane cuts through base & cone gives parabola.
* APPOLONIUS
* Defn. Conics: → determined by a given pt. F (focus), a given line d (dir not containing the focus, and a POSITIVE number e (eccentricity). The con contains a POINT (P) iff $\left|\frac{FP}{PD}\right| = e$ where D is foot of ~~the~~ ⊥ the f

* $e = \left|\frac{FP}{DP}\right|$ } IMP

* ECCENTRICITY MUST BE A POSITIVE NUMERIC.

* If $e = 1$, it gives a parabola.
* If $0 < e < 1$ it gives an ellipse.
* If $e > 1$, it gives a hyperbola.
* If $e = 0$, it gives a circle.

IMP

* ECCENTRICITY = $\boxed{e = \frac{c}{a}}$
* Directrix = $x = \pm \frac{a^2}{c}$

IMP

DEGENERATE CONICS → are formed when the plane intersecting a the co[ne] and the intersection is a POINT. If the planes intersect the cone & we get two intersecting lines.

* Rotation of axis, origin remains same & axes rotates counter clo[ckwise] with an ∡ of θ.

* $\bar{x} = x\cos\theta + y\sin\theta$
$\bar{y} = y\cos\theta - x\sin\theta$

$x = \bar{x}\cos\theta - \bar{y}\sin\theta$
$y = \bar{y}\cos\theta + \bar{x}\sin\theta$

MOST IMP

GENERAL FORM OF A QUADRATIC

a). $Ax^2 - Bxy + Cy^2 - Dx + Ey + F = 0$

b) $A\bar{x}^2 + C\bar{y}^2 + D\bar{x} + E\bar{y} + F = 0$

↳ $-Bxy$ is skipped & $D\bar{x}$ is positive. IMP

To find the ∡ of rotation

→ $\cot 2\theta = \frac{A-C}{B}$ LOOK AT THE TABLE IN THE BOOK.

* RECTANGULAR HYPERBOLA → $xy = 4$ IMP

From pav Wed Jun 3 15:16 EDT 1992
From: hoqax!pav (Paul Vasilopoulos +1 908 949 0278)
To: hlwpj!diane, hlwpj!jolang, hlwpj!vsh, homxb!fine, homxb!jtupino, homxb!khm, homxb!kpd, homxb!march, homxb!norris, homxb!sgbali, homxc!darla, hoqax!pav, homxb!tlr (Thomas L Russell, Jr)
Subject: login
Status: RO

As part of my move to Hosein Fallah's department, my e-mail address has changed to hoqax!pav. For now, my mail is being forwarded from homxb, but this will shortly go away.

Paul

LINEAR SYS. & EQUATIONS

* The graphs of two linear equations intersect at one point; we say that the system is CONSISTENT.
* The graphs of two linear equations intersect at no point; we say that the system is INCONSISTENT.
* The graphs of two linear equations coincide so that the intersection is every point of each line; we say the system DEPENDENT.

* Graph of linear linear → one or none or all.
* Graph of lin & quad → none one or two.
* Graph of quad & quad → none, one, two, three or four solutions
* quadratic & linear equations can be solved algebraically using -

a). SUBSTITUTION &
b). ELIMINATION } IMP

* SUBSTITUTION IS used only if ONE OF THE VARIABLES has the numerical COEFFICIENT OF ONE.