Pre-Calc AB

Lesson 91 + 92

2/15/16

Agenda: 2/15/16

Geometric Progression (91)
Probability of either (92)

★ Handout WS 36

Geometric progression - a progression in which each succeeding term is formed by multiplying the previous term by a constant factor.

called the common ratio

Ex. 2, 4, 8, 16, 32, 64

a_1	a_2	a_3	a_4	a_5	a_6	...	$a_n = a_1 \cdot 2^{(n-1)}$
2	$a_1 * 2$	$a_1 * 2^2$	$a_1 * 2^3$	$a_1 * 2^4$	$a_1 * 2^5$		

★ For any geometric progression with first term a_1 and common ratio r

then $\boxed{a_n = a_1 \cdot r^{(n-1)}}$

x 91.1 Find the fifth term in a geometric sequence whose first term is -2 and common ration is -3.

$a_n = -2(-3)^{n-1}$ so $a_5 = -2(-3)^{5-1} = -2(-3)^4 = \boxed{-162}$

Ex 91.3 Find two geometric means between 2 and $\frac{1}{4}$.

a_1	a_2	a_3	a_4
2	$\underline{1}$	$\underline{\frac{1}{2}}$	$\frac{1}{4}$
a_1	$a_1 r$	$a_1 r^2$	$a_1 r^3$

$\Rightarrow \frac{1}{4} = 2r^3 \Rightarrow \boxed{r = \frac{1}{2}}$

$a_2 = 2 \cdot \frac{1}{2} = \boxed{1}$ $a_3 = 2 \cdot \frac{1}{4} = \boxed{\frac{1}{2}}$

Probability of Either:

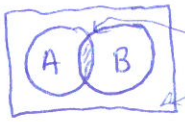
mutually exclusive events - when 1 event occurs the other event is excluded and cannot occur.

Ex. flipping a coin heads or tails not both.

$P(A \text{ or } B) = P(A \cup B) = P(A) + P(B)$ $P(A \text{ and } B) = P(A \cap B) = 0$

Non-mutally exclusive events - overlap or intersection of A and B.

Venn Diagram



$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

Ex 92.1 A card is drawn from a full deck. Probability card is an ace or a black card.

$P(A \cup B) = P(A) + P(B) + P(A \cap B) = \frac{4}{52} + \frac{26}{52} - \frac{2}{52} = \boxed{\frac{7}{13}}$

Ex 92.2 An urn contains 4 white balls and 3 black. 2 rough white, 1 rough black. P of rough or white. $P = \frac{3}{7} + \frac{4}{7} - \frac{2}{7} = \boxed{\frac{5}{7}}$

Pre-Calc AB

Lesson 93

2/16/16

Agenda: 2/16/16

Lesson 93

★ Quiz 11 tomorrow

Advanced Trig Identities

Triangle Inequalities

Ex $\frac{\cos B}{1+\sin B} = \frac{1-\sin B}{\cos B}$

$RHS = \frac{(1-\sin B)\cos B}{\cos^2 B}$ [multiply $\frac{\cos B}{\cos B}$]

$= \frac{(1-\sin B)\cos B}{1-\sin^2 B}$ [Pythagorean]

$= \frac{(1-\sin B)\cos B}{(1-\sin B)(1+\sin B)}$ [Difference of Squares]

$= \frac{\cos B}{1+\sin B} = LHS$ [Canceling]

Ex. Show $(x\tan\theta + y\sec\theta)^2 - (y\tan\theta + x\sec\theta)^2 = -x^2 + y^2$

$LHS = x^2\tan^2\theta + 2xy\tan\theta\sec\theta + y^2\sec^2\theta - (y^2\tan^2\theta + 2xy\tan\theta\sec\theta + x^2\sec^2\theta)$ [foil]

$= \tan^2\theta(x^2-y^2) + \sec^2\theta(y^2-x^2)$ [factor + Simplify]

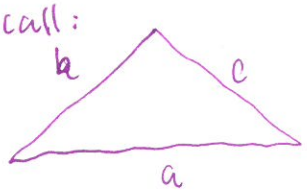
$= \tan^2\theta(x^2-y^2) - \sec^2\theta(x^2-y^2)$ [factor]

$= (x^2-y^2)(\tan^2\theta - \sec^2\theta)$ [factor]

[Pythagorean Identity]

$= -x^2+y^2 = RHS$

Recall:



if $a^2 = b^2 + c^2$ ⇒ right triangle

if $a^2 > b^2 + c^2$ ⇒ obtuse triangle

if $a^2 < b^2 + c^2$ ⇒ acute triangle

93.1 Classify the triangle whose sides are 4, 7, 5

$4^2 + 5^2 = 16 + 25 = 41 < 49$ ⇒ obtuse triangle

$7^2 = 49$

Pre-Calc AB

Lesson 94 + 95

2/18/16

Agenda: 2/18/16
lesson 94 + 95
Graphs of $\sec\theta$, $\csc\theta$, $\tan\theta$, $\cot\theta$ (94)
Advanced complex roots (95)

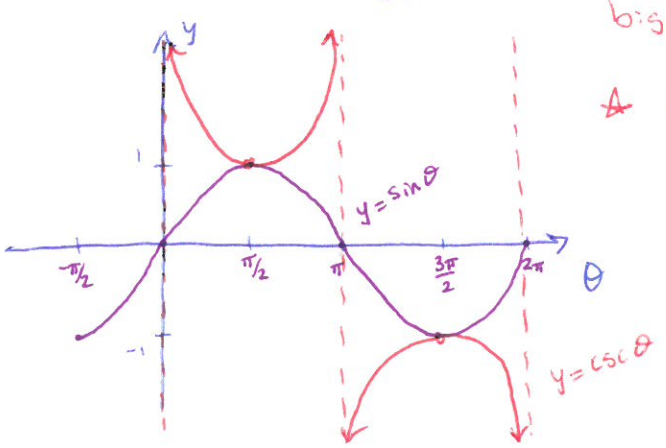
★ Quiz back after lesson

★ Handout WS 37

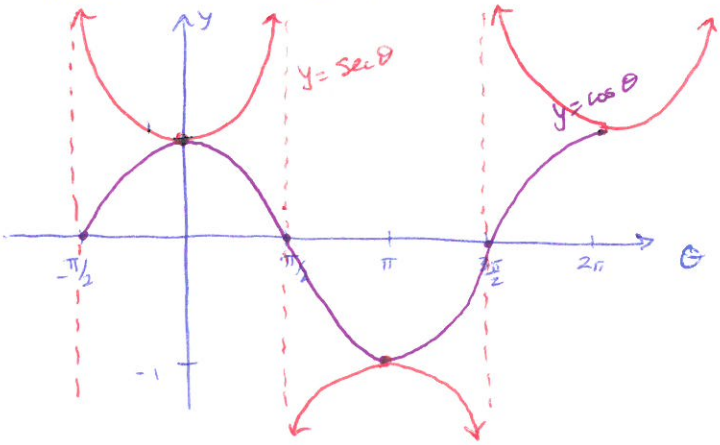
Recall: $f(\theta) = \csc\theta = \frac{1}{\sin\theta}$

Small values → big values
big values → small values

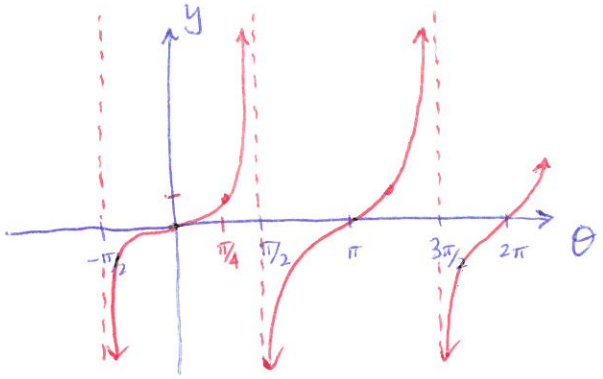
★ when $\sin\theta = 0$ $\csc\theta$ is undefined



$f(\theta) = \sec\theta = \frac{1}{\cos\theta}$



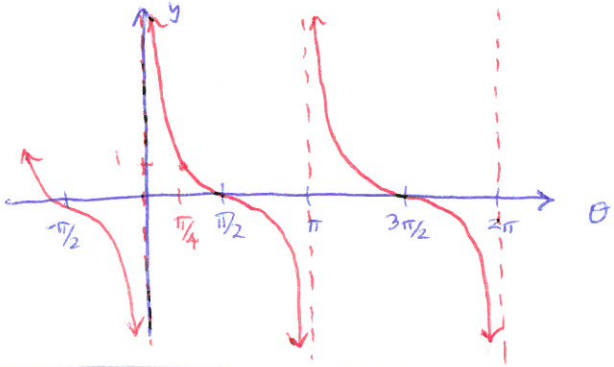
$f(\theta) = \tan\theta = \frac{\sin\theta}{\cos\theta}$



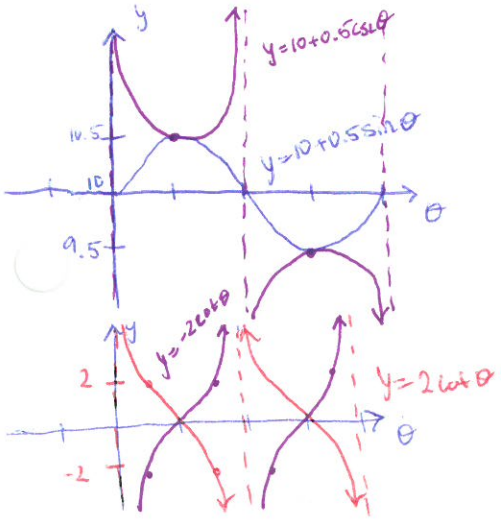
★ $\tan\theta$ is undefined when $\cos\theta = 0$

$f(\theta) = \cot\theta = \frac{\cos\theta}{\sin\theta}$

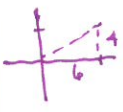
★ $\cot\theta$ is undefined when $\sin\theta = 0$



Ex. Sketch $y = 10 + 0.5\csc\theta$ and $y = -2\cot\theta$



Ex. 95.1 Find the fourth roots of $6 + 4i$ and express in polar form.



$r = \sqrt{52} \approx 7.21$ $\tan\theta = \frac{4}{6}$ $\theta = \arctan\left(\frac{4}{6}\right) \approx 33.69°$

roots:

$(\sqrt{52}\,\text{cis}\,33.69)^{1/4} = 52^{1/8}\,\text{cis}\,8.4225°$

$(\sqrt{52}\,\text{cis}\,393.69)^{1/4} = 52^{1/8}\,\text{cis}\,98.4225°$

$(\sqrt{52}\,\text{cis}\,753.69)^{1/4} = 52^{1/8}\,\text{cis}\,188.4225°$

$(\sqrt{52}\,\text{cis}\,1113.69°)^{1/4} = 52^{1/8}\,\text{cis}\,278.4225°$