Lecture 1 : Course Structure; Review

Exponetials

$e \approx 2.71\ldots$

- $e^{(x+y)} = e^x \cdot e^y$ $\quad x, y$ numbers
- $e^{a \cdot x} = (e^x)^a$ $\quad a$ is a number.

e.g. (1) $(e^2)^3$ simplify

$= e^{2 \cdot 3} = e^6$

Logarithms

- $\ln(x \cdot y) = \ln x + \ln y$
- $\ln(x^a) = a \cdot \ln x$
- $e^{\ln x} = x = \ln(e^x)$

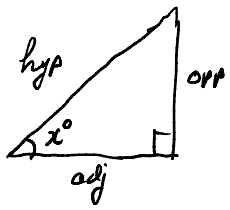
e.g. (2) $\ln\left(\frac{x}{y}\right) = \ln(x \cdot y^{-1})$

$= \ln x + \ln(y^{-1})$

$= \ln x - \ln y$

$\frac{1}{y} = y^{-1}$

Trigonometry



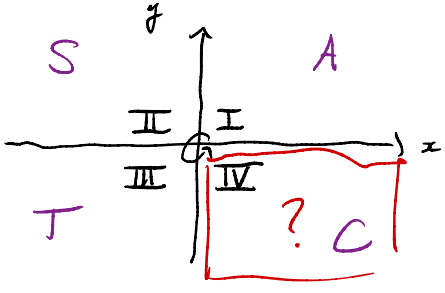
$\sin x = \frac{opp}{hyp}$ $\quad \cos x = \frac{adj}{hyp}$ $\quad \tan x = \frac{opp}{adj}$

$\tan x = \frac{\sin x}{\cos x}$ $\quad \sec x = \frac{1}{\cos x}$ $\quad \csc x = \frac{1}{\sin x}$

$\cot x = \frac{1}{\tan x} = \frac{\cos x}{\sin x}$

Pythagorean ID: $\sin^2 x + \cos^2 x = 1$

e.g. (3) $\cos\theta = {}^2/_3$, θ is in the 4th quadrant find $\sin\theta$.



$(\sin\theta)^2 + ({}^2/_3)^2 = 1$

$(\sin\theta)^2 = {}^5/_9$

$\sin\theta = \pm \sqrt{5}/3$

$\sin\theta = -\sqrt{5}/3$

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Exponetial

$e = 2.71\ldots$

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- $e^{a \cdot x} = (e^x)^a$

Logarithms

- $\ln(xy) = \ln x + \ln y$
- $\ln(x^a) = a \ln(x)$
- $e^{\ln(x)} = x = \ln(e^x)$

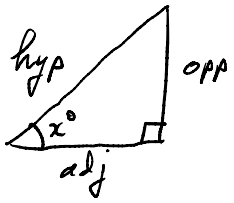
eg ① $\ln\left(\frac{xy}{z}\right) = \ln(xyz^{-1})$

$= \ln x + \ln y + \ln(z^{-1})$

$= \ln x + \ln y - \ln z$

$\frac{1}{z} = z^{-1}$

Trigonometry



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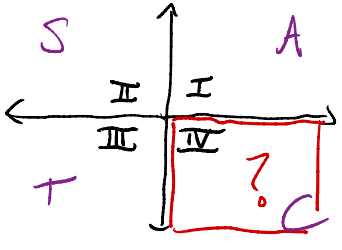

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