Lesson 1: Review

Exponentials

$$e = 2.71 \sim\sim$$

$$e^{x+y} = e^x \cdot e^y$$

$$e^{ax} = (e^x)^a$$

Examples

① $e^2 \cdot e^3 = e^5$

② $e^{-8} \cdot e^m = e^{-8+m} = e^{m-8}$

③ $(e^2)^3 = e^{2 \cdot 3} = e^6$

④ $\dfrac{e^{2x} \cdot e^y}{e^z} = \dfrac{e^{2x+y}}{e^z}$

$$= \frac{1}{e^z} \cdot \left(e^{2x+y}\right)$$

$$= (e^z)^{-1}\left(e^{2x+y}\right)$$

$$= e^{-z} e^{2x+y}$$

$$= e^{-z + 2x + y}$$

Logarithms

$$\ln(xy) = \ln x + \ln y$$

$$\ln(x^a) = a \ln x$$

Examples

⑤ $\ln\left(\frac{xy}{z}\right) = \ln\left(xyz^{-1}\right)$

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

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

⑥ $e^{10 - 2\ln(5)} = e^{10} e^{-2\ln(5)}$

$$= e^{10} e^{\ln(5^{-2})}$$

$$= e^{10} (5^{-2})$$

$$= \frac{e^{10}}{25}$$

(9) $\tan x = \dfrac{\sin x}{\cos x}$ $\cot x = \dfrac{\cos x}{\sin x}$
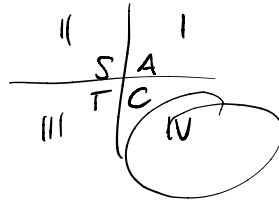
$\sec x = \dfrac{1}{\cos x}$ $\sin^2 x + \cos^2 x = 1$

Very important

$\csc x = \dfrac{1}{\sin x}$

(10) $\cos \theta = 2/3$, θ is in 4th quad

find $\sin \theta$

$$\begin{array}{c|c} II & I \\ S & A \\ \hline T & C \\ III & IV \end{array}$$

$\sin^2 \theta + \left(2/3\right)^2 = 1$

$\sin^2 \theta = 5/9$

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

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