Assignment-5

(1) Prove that $\cosh(\alpha+\beta) - \cosh(\alpha-\beta) = 2\sinh\alpha \sinh\beta$

(2) $\left(\frac{1+\tanh\theta}{1-\tanh\theta}\right)^3 = \cosh 6\theta + \sinh 6\theta$

(3) Express $\cosh^7\theta$ in terms of hyperbolic cosines of multiples of θ.

(4) If $\sin\theta = \tanh x$, prove that $\tan\theta = \sinh x$.

(5) If $\tan\frac{x}{2} = \tanh\frac{u}{2}$, prove that

(i) $\tan x = \sinh u$ and $\cos x \cosh u = 1$.

(ii) $u = \log_e \tan\left(\frac{\pi}{4}+\frac{x}{2}\right)$

(6) If $\cosh x = \sec\theta$, prove that

(i) $\tanh^2\frac{x}{2} = \tan^2\frac{\theta}{2}$

(ii) $x = \log_e \tan\left(\frac{\pi}{4}+\frac{\theta}{2}\right)$

(7) Show that $\tan^{-1} 2 = \frac{i}{2}\log\frac{i+2}{i-2}$

(8) Prove that $\sinh^{-1} x = \tanh^{-1}\frac{x}{\sqrt{1+x^2}}$.

(9) Show that $\operatorname{sech}^{-1}(\sin\theta) = \log\cot\theta/2$.

G-1	(2)	G-6	(4)
G-2	(7)	G-7	6(i)
G-3	(1)	G-8	5(i)
G-4	(3)	G-9	(8)
G-5	(9)	G-10	5(ii)
		G-11	6(ii)

Submit by 22-8-2012