02/15/2001 **NAME:**

MATH 1151 QUIZ-1 (15 minutes)

1. (3 points) Establish the identity $\frac{\tan\alpha+\tan\beta}{\cot\alpha+\cot\beta} = \tan\alpha\tan\beta$.

Solution: Since $\cot\alpha = \frac{1}{\tan\alpha}$ and $\cot\beta = \frac{1}{\tan\beta}$ left side of the equation is equal to $\frac{\tan\alpha+\tan\beta}{\frac{1}{\tan\alpha}+\frac{1}{\tan\beta}}$ which is then equal to $\tan\alpha\tan\beta$ after summing the denominator and flipping it over. **Q.E.D.**

2.(3 points) Establish the identity $\frac{\sin(\alpha+\beta)}{\cos\alpha\cos\beta} = \tan\alpha + \tan\beta$.

Solution: $\sin(\alpha+\beta) = \sin\alpha\cos\beta + \sin\beta\cos\alpha$. So if you use this identity then left side turns to $\frac{\sin\alpha\cos\beta}{\cos\alpha\cos\beta} + \frac{\sin\beta\cos\alpha}{\cos\alpha\cos\beta}$. After cancellations in each fraction we get $\tan\alpha + \tan\beta$. **Q.E.D**

3.(4 points) Find the value of the number C: $\frac{1}{2}(\cos x)^2 + C = \frac{1}{4}\cos 2x$.

Solution: $\cos 2x = 2(\cos x)^2 - 1$, so if you use this identity on the right side we get $\frac{1}{2}(\cos x)^2 - \frac{1}{4}$ on the right. Making this equal to the left side we easily see that $C = -\frac{1}{4}$. **Q.E.D.**