

Math 1151 Sample Exam-2

Name:

I.D.

Section No.

March 19, 2007

Show all your work for full credits. No calculator, notes, or books are allowed. Try to simplify your answers as much as possible. The total score will be of 100 points.

1. (10 points) What are the **domain** and the **range** of $y = \sin^{-1} x$?

2. (10 points) Find the exact value of the following.

(a) $\cos[\cos^{-1}(0.3)] + \sin[\sin^{-1}(0.5)]$.

(b) $\tan^{-1} \sqrt{3}$.

3. (30 points) Establish each identity.

(a)

$$\tan^2 \theta \cos^2 \theta + \cot^2 \theta \sin^2 \theta = 1$$

(b)

$$\frac{\sec \theta}{1 + \sec \theta} = \frac{1 - \cos \theta}{\sin^2 \theta}.$$

4. (20 points) Solve each equation for θ and check your solutions.

(a)

$$\sin \theta + \cos \theta = \sqrt{2}, \quad 0 \leq \theta < 2\pi.$$

(b)

$$2 \sin \theta = \sqrt{3}, \quad 0 \leq \theta < 2\pi.$$

5. (30 points) Suppose the following conditions

$$\cos \alpha = \frac{1}{2}, \quad 0 < \alpha < \frac{\pi}{2}; \quad \sin \beta = \frac{1}{3}, \quad 0 < \beta < \frac{\pi}{2}.$$

Then find the exact value of each of the following:

$$(a) \sin(\alpha + \beta), \quad (b) \sin(2\alpha), \quad (c) \cos(\alpha - \beta).$$

[Hint: Use the formula: $\sin(\alpha + \beta) = \sin \alpha \cos \beta + \cos \alpha \sin \beta$, and $\cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta$.]