

EXAM 4 - MATH 140

DATE: Thursday, April 7

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Find the exact value of the expression $\csc(\cot^{-1}(-\frac{1}{2}))$.
2. Prove the identity $\frac{\cos \theta}{1+\sin \theta} + \frac{1+\sin \theta}{\cos \theta} = 2 \sec \theta$ starting from the left-hand side.
3. Calculate the value of the expressions $\cos(\alpha - \beta)$ and $\sin(\alpha - \beta)$, where
$$\tan \alpha = -\frac{5}{12}, \frac{\pi}{2} < \alpha < \pi, \sin \beta = \frac{1}{3}, 0 < \beta < \frac{\pi}{2}.$$
4. Find the exact value of the expression $\tan(\frac{\pi}{4} - \cos^{-1} \frac{3}{5})$.
5. Show that $1 - \frac{1}{2} \sin(2\theta) = \frac{\sin^3 \theta + \cos^3 \theta}{\sin \theta + \cos \theta}$.
6. Solve the equation $3 - \sin \theta = \cos(2\theta)$.