

Sample Exam for the Final Exam - Version 2

1. Graph the function $f(x) = \arccos x$ and state its domain and range.
2. Find the exact value for each of the following.

(a)
$$\frac{\tan \frac{2\pi}{15} + \tan \frac{\pi}{5}}{1 - \tan \frac{2\pi}{15} \left(\tan \frac{\pi}{5} \right)} =$$

(b) $\cos 105^\circ =$

3. Prove each of the following identities.

(a)
$$\frac{\cos x - \cos y}{\cos x + \cos y} = -\tan \frac{x+y}{2} \tan \frac{x-y}{2}$$

(b)
$$\cot 3x = \frac{3 \tan^2 x - 1}{\tan^3 x - 3 \tan x}$$

4. Suppose that $\pi < \alpha < \frac{3\pi}{2}$ and $\cos \alpha = -\frac{3}{5}$ and that $\frac{\pi}{2} < \beta < \pi$ and $\cos \beta = -\frac{28}{53}$. Find the exact value of each of the following.

(a) $\sin \frac{\beta}{2} =$

(b) $\cos(\beta - \alpha) =$

(c) $\tan(\alpha + \beta) =$

(d) $\sin 3\alpha =$

5. Solve the equation $\sin 6x = -\frac{1}{2}$. Present the exact value for all solutions within the interval $[0, 2\pi]$, in degrees.
6. Solve the following triangle. $a = 4$ $b = 3$ $\alpha = 40^\circ$
7. A particle is traveling on a circular path of radius 200 m, centered around the origin. It starts at $P(200, 0)$ and it completes a cycle in every 25 seconds.
 - (a) Find the linear speed of the particle.
 - (b) Find the angular velocity of the particle.
 - (c) Find the coordinates of the particle after a minute.