

Sample Exam for Exam 3

- Plot the graph of the function $f(x) = 3 \sin(2x - \pi) + 1$ on the interval $[-2\pi, 2\pi]$.
- Find the exact value for each of the following expressions.
 - $\cos 22.5^\circ =$
 - $\cos 15^\circ \cos 75^\circ =$
 - $\frac{\tan 65^\circ - \tan 5^\circ}{1 + (\tan 65^\circ) \tan 5^\circ} =$
- Prove each of the following identities.
 - $\frac{\sin x + \sin 5x}{\cos x + \cos 5x} = \tan 3x$
 - $1 - \left(\cos \frac{x}{2} - \sin \frac{x}{2}\right)^2 = \sin x$
- Write $\sin 8x \sin 5x$ as a sum or difference.
- Find the exact value of all solutions for each of the following equations. Present your answer in radians.
 - $\sin x = \sin 2x$
 - $7 \sin x + 1 = 6 \cos^2 x$
 - $\tan 6x = -\frac{1}{\sqrt{3}}$
 - $\sin x - \sqrt{3} \cos x = 1$
- Suppose that $\sin \alpha = -\frac{5}{13}$ and α is not in the fourth quadrant; $\cos \beta = \frac{7}{25}$ and β is not in the first quadrant. Find the exact value for each of the following.
 - $\tan(\alpha - \beta) =$
 - $\cos(\alpha + \beta) =$
 - $\cos 2\alpha =$
 - $\tan \frac{\alpha}{2} =$
- A particle is moving on a circular path of radius 170 m. It completes a cycle in every 1.8 seconds.
 - Find the angular velocity of the particle in radians per second.
 - Find the linear velocity of the particle in meters per second.
- Let $\underline{u} = 3\underline{i} - \underline{j}$ and $\underline{v} = 5\underline{i} + \underline{j}$
 - Find $2\underline{v} - 3\underline{u}$.
 - Express \underline{u} in polar form.
 - Find the vector that we obtain by rotating \underline{v} by 45° .