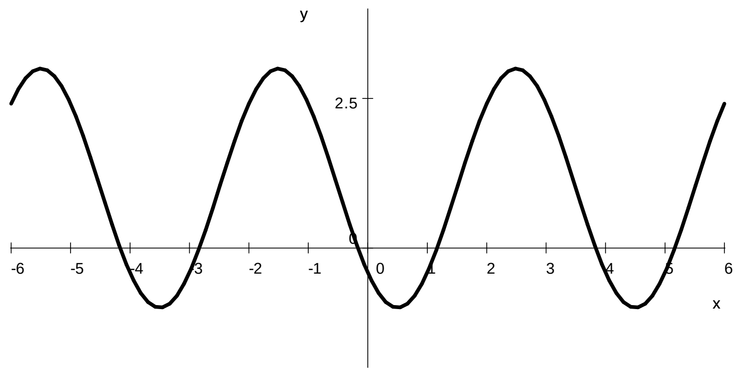
Sample Exam for the Final Exam - Version 1

SOLUTIONS

1. .



2. .

   (a) $\frac{1}{2}\sqrt{3}$

   (b) $-\frac{1}{2}\sqrt{3}$

   (c) 1

3. Prove each of the following identities.

   (a) $\sec x + \tan x = \dfrac{\cos x}{1 - \sin x}$

   Solution: $LHS = \dfrac{1}{\cos x} + \dfrac{\sin x}{\cos x} = \dfrac{1 + \sin x}{\cos x}\dfrac{\cos x}{\cos x} = \dfrac{(1 + \sin x)\cos x}{\cos^2 x}$

   $= \dfrac{(1 + \sin x)\cos x}{1 - \sin^2 x} = \dfrac{(1 + \sin x)\cos x}{(1 + \sin x)(1 - \sin x)} = RHS$

   (b) $\dfrac{\sin 18x + \sin 8x}{\sin 8x - \sin 2x} = \dfrac{\sin 13x}{\sin 3x}$

   Solution: $LHS = \dfrac{\sin 18x + \sin 8x}{\sin 8x - \sin 2x} =$

   $\dfrac{\sin 13x \cos 5x + \cos 13x \sin 5x + \sin 13x \cos 5x - \cos 13x \sin 5x}{\sin 3x \cos 5x + \cos 3x \sin 5x + \sin 3x \cos 5x - \cos 3x \sin 5x} = \dfrac{2 \sin 13x \cos 5x}{2 \sin 3x \cos 5x} = RHS$

4. Solve each of the following equations. Present your answer in radians, exact values.

   (a) $\pi + 2k\pi$ and $\pm\frac{2}{3}\pi + 2k\pi$ where $k \in \mathbb{Z}$

   (b) $\pi + 2k\pi$ and $\dfrac{\pi}{2} + 2k\pi$ where $k \in \mathbb{Z}$

   (c) $x = \dfrac{\pi}{24} + \dfrac{k\pi}{4}$ where $k \in \mathbb{Z}$

5. .

   (a) $\alpha_1 = 26.66585°$ $\quad \gamma_1 = 106.3415°$ $\quad c = 14.433$

6. $133.332°$

7. .

   (a) $-2-2i$

   (b) $-4+7i$