Sample Chapter 7 Exam Questions

1. Without using a calculator, find the exact value of

(a) \( \sec \left( -\frac{17\pi}{3} \right) \)

(b) \( \sin 18^\circ \cos 27^\circ + \cos 18^\circ \sin 27^\circ \)

(c) \( \sin \left( \frac{\pi}{12} \right) \)

(d) \( \tan^{-1} \left( -\frac{\sqrt{3}}{3} \right) \)

2. If \( \sin \theta = -\frac{4}{5} \) and \( \theta \) is in quadrant III, find \( \tan \left( \frac{\theta}{2} \right) \).
3. Find the area of the shaded region shown in the figure.

*I will provide the figure during the first review session (December 1).

4. Verify the identity \( \frac{1 + \cos x}{1 - \cos x} - \frac{1 - \cos x}{1 + \cos x} = 4 \cot x \csc x \).

5. Verify the identity \( \frac{\sin 3x + \sin 7x}{\cos 3x - \cos 7x} = \cot 2x \).
6. Verify the identity \( \tan 3x = \frac{3 \tan x - \tan^3 x}{1 - 3 \tan^2 x} \).

7. Find all solutions of \( \tan^4 x \sin x - 9 \sin x = 0 \).

8. To estimate the height of a building above a level plain, a surveyor measures the angle of elevation to the top of the building to be 28.5°. Three hundred feet closer to the building the angle of elevation is 32.5°. Estimate the height of the building. Round your answer to the nearest foot.