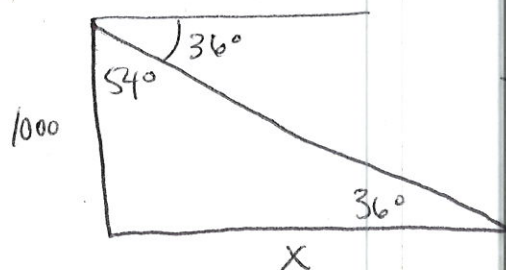


Instructions: Show all work. Use exact answers unless specifically asked to round. Answer all parts of each question.

1. A helicopter hovers 1000 feet above a small island. The angle of depression from the helicopter to a point P on the coast is 36° . How far off the coast is the island?



$$\tan 36^\circ = \frac{1000}{x}$$

$$x = \frac{1000}{\tan 36^\circ} = 1376.4 \text{ ft}$$

2. Verify the following identities.

a. $\frac{\csc x - \sec x}{\csc x + \sec x} = \frac{\cot x - 1}{\cot x + 1}$

$$\frac{\frac{1}{\sin x} - \frac{1}{\cos x}}{\frac{1}{\sin x} + \frac{1}{\cos x}} \cdot \frac{\cos x}{\cos x} = \frac{\frac{\cos x}{\sin x} - \frac{\cos x}{\cos x}}{\frac{\cos x}{\sin x} + \frac{\cos x}{\cos x}} = \frac{\cot x - 1}{\cot x + 1}$$

b. $\frac{\sin \theta - \cos \theta}{\sin \theta} + \frac{\cos \theta - \sin \theta}{\cos \theta} = 2 - \sec \theta \csc \theta$

$$\frac{\sin \theta}{\sin \theta} - \frac{\cos \theta}{\sin \theta} + \frac{\cos \theta}{\cos \theta} - \frac{\sin \theta}{\cos \theta} =$$

$$1 - \frac{\cos \theta}{\sin \theta} + 1 - \frac{\sin \theta}{\cos \theta} = 2 - \frac{\cos^2 \theta + \sin^2 \theta}{\sin \theta \cos \theta}$$

$$= 2 - \frac{1}{\sin \theta \cos \theta} = 2 - \sec \theta \csc \theta$$