
Chapter 6 Test

1. Knowledge and Understanding

Solve each triangle. Round each value to the nearest tenth of a unit.

(a) $\triangle XYZ$; $\angle X = 30^\circ$, $\angle Z = 20^\circ$, and $y = 9$ cm

(b) $\triangle DEF$; $d = 7$ m, $e = 9$ m, and $f = 5$ m

2. Communication

In $\triangle ABC$, $\angle A = 20^\circ$, $a = 4$ cm, and $b = 9$ cm. By comparing a , b , and $b \sin A$, determine the number of possible solutions. *Describe* the solution(s), but do not calculate the unknown sides and angles.

3. Knowledge and Understanding

Determine each value exactly.

(a) $\sin \frac{\pi}{3} \cos \frac{\pi}{4} - \cos \frac{5\pi}{6} \sin \frac{\pi}{4}$

(b) $\cos 60^\circ \cos 210^\circ - \sin 45^\circ \sin 135^\circ$

4. Knowledge and Understanding

Solve.

(a) $2 \sin^2 \theta - 1 = 0$, $0 \leq \theta \leq 2\pi$

(b) $2 \tan^2 \alpha - \tan \alpha - 3 = 0$, $0 \leq \alpha \leq 360^\circ$

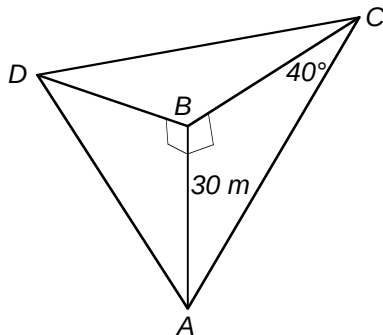
5. Thinking, Inquiry, Problem Solving / Communication

Prove each identity.

(a) $\frac{\tan \beta}{\sin \beta} = \frac{\cos \beta}{1 - \sin^2 \beta}$

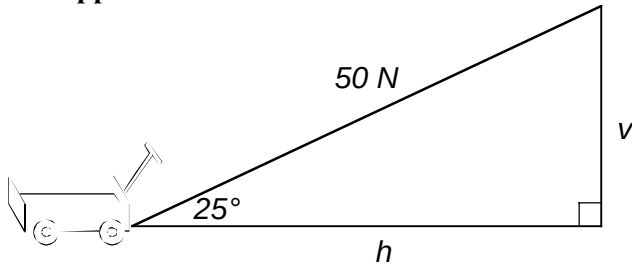
(b) $\cos^4 \alpha - \sin^4 \alpha = 1 - 2 \sin^2 \alpha$

6. Thinking, Inquiry, Problem Solving



Ann swims at a bearing of 200° from the charter boat, sets a buoy as a marker, and dives 30 m to investigate a shipwreck. From the charter boat, the angle of depression to Ann is 40° . Dan swims 80 m from the charter boat at a bearing of 250° , but becomes distressed before setting his buoy. Is Ann or is the charter boat closer to Dan?

7. Application / Communication



A child pulls a wagon with a force of 50 N at an angle of 25° to the horizontal.

- (a) What force (the horizontal component) moves the wagon forward?
- (b) What force (the vertical component) lifts the wagon?
- (c) Describe the effect of changing the angle at which the child holds the handle on the force in the forward direction. Consider several cases.