Practice Questions on Height and Distance

Name: _____ Date: _____

Height and Distance Practice Worksheet

1. Angle = 30°, distance = 40 m → height?

   Answer: $40/\sqrt{3} = 40\sqrt{3}/3$ m

2. Angle = 60°, height = 30 m → distance?

   Answer: $30/\sqrt{3} = 10\sqrt{3}$ m

3. Angle = 45°, height = 50 m → distance?

   Answer: 50 m (same as height at 45°)

4. Shadow = 20 m, height = 20 m → sun angle?

   Answer: 45°

5. Hypotenuse (ladder) = 10 m, angle = 30° → height?

   Answer: 10 × sin 30° = 5 m

6. Height = $10\sqrt{3}$ m, distance = 10 m → angle?

   $\tan\theta = 10\sqrt{3}/10 = \sqrt{3} \rightarrow \theta = 60°$

7. Two poles of heights 6m and 11m stand 12m apart.

   Find the distance from the top of shorter pole

   to top of taller pole.

   Height difference = 11-6 = 5 m

   Horizontal = 12 m

Distance = $\sqrt{(5^2 + 12^2)} = \sqrt{(25+144)} = \sqrt{169} = 13$ m

8. Elevation of tower top = 60°, from foot = 45°.

Observer 40 m from tower. Height above observer?

h - observer height = $40 \times \tan 60° = 40\sqrt{3}$ m

(If observer is at ground, h = $40\sqrt{3}$ m)

9. From a point on the ground, angles of elevation

of bottom and top of a flagstaff on a 20 m

building are 45° and 60° respectively.

Find height of flagstaff.

Building height = 20 m

Distance d: $\tan 45° = 20/d \rightarrow d = 20$ m

Total height: $\tan 60° = H/20 \rightarrow H = 20\sqrt{3}$ m

Flagstaff height = $20\sqrt{3} - 20 = 20(\sqrt{3}-1)$ m

10. A man on top of a building 25 m high sees two

cars on the opposite side at angles 30° and 60°.

Find the distance between the two cars.

Car 1: $d1 = 25/\tan 60° = 25/\sqrt{3}$ m

Car 2: $d2 = 25/\tan 30° = 25\sqrt{3}$ m

Distance = $d2 - d1 = 25\sqrt{3} - 25/\sqrt{3}$

$= (75 - 25)/\sqrt{3} = 50/\sqrt{3} = 50\sqrt{3}/3$ m