Unit 15 · Trigonometry

HARDER WORKSHEET

Full marks 22

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 22

1 A tower between two points [3]

Solve. Show your working. Draw a figure.

Two points P and Q on level ground are 80 m apart, with a tower between them on the line PQ. The angles of elevation of its top from P and Q are 60° and 30°. Find the height of the tower and how far it stands from each point.

Answer: _____

2 A flagpole on a building [3]

Solve. Show your working. Draw a figure.

A flagpole stands on top of a building 10 m high. From a point on the ground, the angle of elevation of the top of the building is 30°, and of the top of the flagpole 45°. Find the length of the flagpole.

Answer: _____

3 Two cars from a tower [3]

Solve. Show your working. Draw a figure.

From the top of a tower 100 m high, two cars on a straight road leading away from its foot are seen at angles of depression of 60° and 45°. How far apart are the cars?

Answer: _____

4 Show that [3]

Answer the following question.

The angle of elevation of the top of a tower is α from a point, and β from a point d meters nearer to it on the same line. Show that the height of the tower is

$$h = \frac{d}{\cot \alpha - \cot \beta}.$$

Then check it with the tower in the usual worksheet: 30°, then 60° after walking 20 m.

5 Shadows at two times [3]

Solve. Show your working.

A pole's shadow is 10 m longer when the sun's angle of elevation is 45° than when it is 60°. Find the height of the pole.

Answer: _____

6 The ladder slips [3]

Solve. Show your working.

A ladder 6 m long leans against a wall, making 60° with the ground. Its foot slips until the ladder makes 30° with the ground. How far does its top slide down the wall, and how far does its foot move out?

Answer: _____

7 Is the report possible? [2]

Answer the following question. Give reasons.

A student whose eye is 1.5 m above the ground reports: "I stood 20 m from a tree 10 m tall, and the angle of elevation of its top was 60°." Can this be right?

8 Make your own [2]

Write a question, then solve it.

Write a heights-and-distances question set in your town that uses an angle of $30°$ and whose answer is $20\sqrt{3}$ m. Solve it.