

Heights and Distances - Angle of Elevation

Chapter 9: Some Applications of Trigonometry · Topic 1

Key Concept

For example, if the angle of elevation to the top of a tower from a point 30m away is 30° , the tower's height can be calculated using $\tan(30^\circ) = \text{height}/30$, giving $\text{height} = 30 \times \tan(30^\circ) \approx 17.3\text{m}$. This practical application of trigonometry, called 'heights and distances,' is widely used in surveying, architecture, navigation, and even in everyday estimations, like judging how far away and how tall a building appears based on the angle at which you view it.

Quick Revision Notes

- The angle of elevation is the upward angle from horizontal to a line of sight towards an object.
- Height calculations use $\tan(\text{angle}) = \text{height}/\text{horizontal distance}$.
- Example: angle of elevation 30° from 30m away gives height $\approx 17.3\text{m}$.
- This application, 'heights and distances,' is used in surveying, architecture, and navigation.

Practice Questions

- 1 A tower's angle of elevation from a point 30m away is 30° . Find the tower's height.
- 2 A flagpole casts a shadow, and the angle of elevation to its top is 45° . If the shadow is 10m long, find the flagpole's height.
- 3 Explain the difference between the angle of elevation and a horizontal line of sight.