

Heights and Distances - Angle of Depression

Chapter 9: Some Applications of Trigonometry · Topic 2

Key Concept

A key geometric relationship exists: the angle of depression from a higher point to a lower point is always equal to the angle of elevation from that lower point back up to the higher point, since these are alternate angles formed by the horizontal lines (which are parallel) and the shared line of sight. For example, from the top of a 50m cliff, if the angle of depression to a boat is 30° , using $\tan(30^\circ) = 50/\text{distance}$, the boat's distance from the cliff's base can be calculated as $\text{distance} = 50/\tan(30^\circ) \approx 86.6\text{m}$.

Quick Revision Notes

- The angle of depression is the downward angle from horizontal to a line of sight towards an object below.
- The angle of depression equals the angle of elevation viewed from the opposite point (alternate angles).
- Example: from a 50m cliff with 30° angle of depression, distance to boat $\approx 86.6\text{m}$.
- These angles are equal because the two horizontal lines involved are parallel.

Practice Questions

- 1 From the top of a 50m cliff, the angle of depression to a boat is 30° . Find the distance of the boat.
- 2 Explain why the angle of depression equals the angle of elevation between the same two points.
- 3 A person on a 20m building looks down at a car with an angle of depression of 45° . Find the car's distance from the building's base.