**Angles of elevation and depression worksheet answer key printable free**

Let O be the eye of an observer and A be an object below the level of the eye. The ray OA is called the line of sight. Let OB be the horizontal line through O. Then the angle BOA is called the angle of depression of the object A as seen from O. It may so happen that a man climbs up the pole, keeps his eyes at a point O and see the object placed at the point A is the angle of depression of the point A with respect to the point O.  How can we get the angle of depression? We shall have to imagine a straight line OB parallel to the straight line CA. The measure of the angle of depression will be ∠BOA. It is clear from the figure below that the angle of elevation of A as seen from B = the angle of depression of B as seen from A. Therefore, ∠θ = ∠β. Note: 1. Here, BC ∥ DA and AB is the transversal. So the angle of elevation ∠ABC = the angle of depression ∠BAD. But even then they are to be indicated to solve problems. 2. The observer is taken as a point unless the height of the observer is given.3. √3 = 1.732 (Approximately). 10th Grade Heights and Distances Solved Examples on Angle of Depression:1. From the top of a tower, a man finds that the angle of depression of a car on the ground is 30°. If the car is at a distance 40 metres from the tower, find the height of the tower.Solution:Let PQ be the tower and the car is at R. The angle of depression = ∠SPR = 30° and QR = 40 m.From geometry, ∠PRQ = ∠SPR = 30°. In the right-angled ΔPQR, tan  30° = \(\frac{PQ}{QR}\) ⟹ \(\frac{1}{√3}\) = \(\frac{PQ}{40 m}\) ⟹ √3PQ = 40m ⟹ PQ = \(\frac{40}{√3}\) m ⟹ PQ = \(\frac{40√3}{3}\) m ⟹ PQ = \(\frac{40 × 1.732}{3}\) m ⟹ PQ = 23 m (Approx.).Therefore, the height of the tower is 23 m (Approx.).Angle of Depression Example 2. From the top of a cliff 200 m height, the angles of depression of two places A and B on the ground and on the opposite sides of the cliff are 60° and 30°. Find the distance between M and N.Solution:Let TO be the cliff, and given that TO = 200 m.M and N are the two points.The angle of depression ∠X'TM = 60° and ∠XTN = 30°.By geometry, ∠TMO = 60° and ∠TNO = 30°. In the right-angled ΔTOM, tan 60° = \(\frac{TO}{MO}\) ⟹ √3  = \(\frac{200 m}{MO}\) ⟹ MO  = \(\frac{200 m}{√3}\)In the right-angled ΔTON, tan 30° = \(\frac{TO}{NO}\) ⟹ \(\frac{40}{√3}\) = \(\frac{200 m}{NO}\) ⟹ NO  = 200√3 m.Therefore, the required distance MN = MO + NO = \(\frac{200 m}{√3}\) + 200√3 m. = \(\frac{200 + 600}{√3}\) m = \(\frac{800}{√3}\) m = \(\frac{800√3}{3}\) m = \(\frac{800 × 1.732}{3}\) m = 461.89 m (Approx.)Word problems on Angle of Depression:3. A building stands on the bank of a river. A man observes from a corner of the roof of the building, the foot of a electric post just on the opposite bank. If the angle of depression of the foot of the light post at your eye is 30° and the height of the building is 12 meters, what is the width of the river? Solution: Let P is the roof of the building, Q is the foot of the building vertically below the corner point and R is the foot of the light post just on the opposite of the bank of the river. A right-angled triangle PQR is formed by joining these points. Let PS be the horizontal line through P.∠SPR, the angle of depression = ∠PRQ = 30°, and with respect to this angle perpendicular PQ = 12 metres and base QR = width of the river = h metres.From right-angled triangle PQR,\(\frac{PQ}{QR}\) = tan 30°\(\frac{12}{h}\) = \(\frac{1}{√3}\)⟹ h = 12 × √3⟹ h = 12 × 1.732⟹ h = 20.784 (Approximately)Therefore, the width of the river is 20.784 meters (Approximately).Angle of Depression Problem:4. From the top of a building, the angle of depression of the top and the foof of a lamp post are 30° and 60° respectively. What is the height of the lamp post?Solution:According to the problem, the height of the building PQ = 12 m.Let height of the lamp post RS.Angle of depression of the top of a lamp post is 30°Therefore, ∠TPR = 30°.again, Angle of depression of the foot of a lamp post is 60°Therefore, ∠TPS = 60°.PQ = TS = 12 m.Let the height of the lamp post RS = h m. Therefore, TR = (12 - h) m.Also, let PT = x mNow tan ∠TPR = \(\frac{TR}{PT}\) = tan 30°Therefore, \(\frac{12 - h}{x}\) = \(\frac{1}{√3}\) ..... (i)Again, tan ∠TPS = \(\frac{TS}{PT}\) = tan 60°Therefore, \(\frac{12}{x}\) = √3 ..... (ii)Dividing (i) by (ii), we get\(\frac{12 - h}{12}\) = \(\frac{1}{3}\)⟹ 36 - 3h = 12⟹ 3h = 36- 12⟹ 3h = 24⟹ h = \(\frac{24}{3}\)⟹ h = 8Therefore, height of the lamp post is 8 metres. In worksheet on heights and distances we will practice different types of real life word problem trigonometrically using a right-angled triangle, angle of elevation and angle of depression.1. A ladder rests against a vertical wall such that the top of the ladder reaches the We will solve different types of problems on height and distance with two angles of elevation. Another type of case arises for two angles of elevations. In the given figure, let PQ be the height of pole of ‘y’ units. QR be the one of the distance between the foot of the pole We have already learnt about trigonometry in previous units in detail. Trigonometry has its own applications in mathematics and in physics. One such application of trigonometry in mathematics is “height and distances”. To know about height and distances, we have to start Reading Trigonometric Tables Trigonometric tables consist of three parts. (i) On the extreme left, there is a column containing 0 to 90 (in degrees). (ii) The degree column is followed by ten columns with the headings 0′, 6′, 12′, 18′, 24′, 30′, 36′, 42′, 48′ and 54′ or We know the values of the trigonometric ratios of some standard angles,0°, 30°, 45°, 60° and 90°. While applying the concept of trigonometric ratios in solving the problems of heights and distances, we may also require to use the values of trigonometric ratios of nonstandard Reading Trigonometric Tables Trigonometric tables consist of three parts. (i) On the extreme left, there is a column containing 0 to 90 (in degrees). (ii) The degree column is followed by ten columns with the headings 0′, 6′, 12′, 18′, 24′, 30′, 36′, 42′, 48′ and 54′ 10th Grade MathFrom Angle of Depression to HOME Didn't find what you were looking for? Or want to know more information about Math Only Math. Use this Google Search to find what you need. Share this page: What’s this? In order to continue enjoying our site, we ask that you confirm your identity as a human. Thank you very much for your cooperation. Students complete fill-in-the-blank style guided notes on Angles of Elevation and Depression. Then students practice their new vocabulary on application problems to solve right triangles.Space is provided for students to show work, because I like to see my students work :) and have opportunities for feedback.Skills: Students will solve application problems of right triangles using sine, cosine, tangent functions; as well as inverse sine, inverse cosine, and inverse tangent functions.Differentiat

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