

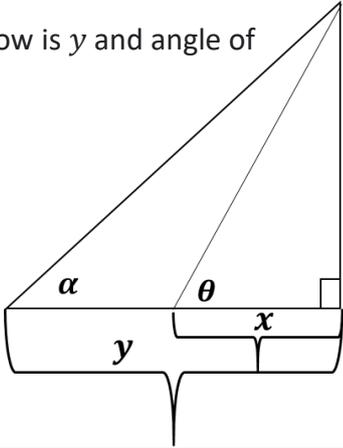
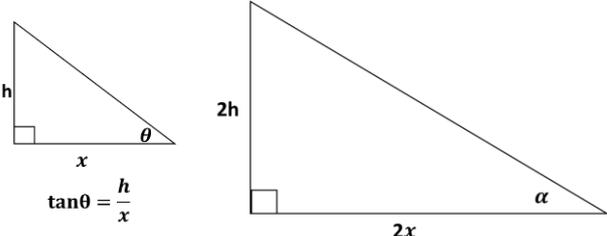
CISCE VIRTUAL LEARNING SERIES

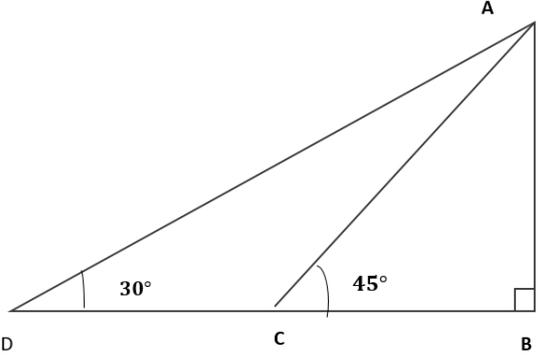
LESSON: MATHEMATICS

TRIGONOMETRY (HEIGHTS AND DISTANCES) – SESSION 2

November 20th, 2020

Response to Questions posed by students during the live Lesson:

S.No.	Questions	Answers
1.	If the length of the shadow of a tower is increasing will the angle of elevation of the sun increase or decrease?	<p>Decreases. Let us see how?</p> <p>From the diagram we see, when length of the shadow is x and angle of elevation is θ.</p> <p>when length of the shadow is y and angle of elevation is α</p> <p>With $x < y \Rightarrow \theta > \alpha$</p> 
2.	The height of a building and the distance of the point of observation from its foot are both doubled then will the angle of elevation of its top also be double?	<p>No, it will remain the same. Let us find out how?</p>  <p>$\tan\theta = \frac{h}{x}$</p> <p>$\tan\alpha = \frac{2h}{2x} \Rightarrow \tan\alpha = \frac{h}{x}$</p> <p>Hence $\tan\theta = \frac{h}{x} = \tan\alpha$</p> <p>$\Rightarrow \theta = \alpha$</p>
3.	In board examination, will questions on heights and distances be asked in the compulsory section?	<p>As per the scope of syllabus topics are not divided for Section A and Section B.</p> <p>So, in the compulsory section questions may come from any topic. But difficulty level varies.</p>

S.No.	Questions	Answers
4.	May we use the formula to solve sums on heights and distances?	<p>Yes, you may use the formula to solve sums on Heights and Distances.</p> <p>You must first write down the formula you are using, draw the necessary diagram.</p> <p>Substitute the given data in the formula.</p>
5.	What will be the answer for 273.7, 2737, and 0.2737 rounded off to three significant figures?	<p>273.7 rounded off is 274</p> <p>2737 rounded off is 2740</p> <p>0.2737 rounded off is 0.274</p>
6.	<p>The shadow of a vertical tower on a level ground increases by 10m when the altitude of the sun changes from 45° to 30°. Find the height of the tower, correct to two decimal places.</p> <p>How do we use the formula to solve the sum?</p>	<p>Height = $\frac{\text{Distance between the two points C and D}}{\cot\alpha - \cot\theta}$</p>  <p>Applying formula to find height:</p> $\begin{aligned} \text{Height} &= \frac{\text{Distance CD}}{\cot 30^\circ - \cot 45^\circ} \\ &= \frac{10}{\sqrt{3} - 1} \\ &= \frac{10(\sqrt{3} + 1)}{(\sqrt{3} - 1)(\sqrt{3} + 1)} \\ &= \frac{10(1.732 + 1)}{3 - 1} \\ &= \frac{10 \times 2.732}{2} \\ &= \mathbf{13.66m} \end{aligned}$
7.	In case of decimal answer, if our answer differs by 0.01 or 0.1 then will it be considered correct?	No. If you have done by the correct method and all calculations correctly done, then there will be no difference in the answer. If there is difference in answer you will lose your answer mark.

S.No.	Questions	Answers
8.	After our working if we get an answer as root of 59 then what should we do?	You may use your Mathematical Tables to look up its value.
9.	What is the maximum root value which we need to remember?	You are expected to know the value of $\sqrt{2} = 1.414$ and $\sqrt{3} = 1.732$
10.	Do we have to show the derivation of the formula? Can it come as a question?	No. You can apply the formula to solve sums on heights and distances.
11.	If the height of an object is measured using the hand made clinometer will the result be close to the actual length?	Yes. If the experiment is done correctly then the percentage error is very low.