

Mathematricks

- Sreenivasa Rao Ainapurapu.

Vivek is an engineer by profession and he loves to play with kids giving some puzzles and trick questions. Once he took a group of kids to a site seeing trip. While walking he posed a question “A person stood in 200 yards in front of a tall building and watched the top at an angle 45° to the horizon. He moved little further towards the building 100 yards from building and watched the top of the building at angle 60° to the horizon. Ignoring the height of the person, how tall is the building?”

The kids gave different answers. One of them said “without drawing a picture how can we say?” Another kid said “I need to see logarithms book.” A kid good at using calculator said “I need to have calculator.” With a smile Vivek said “ You don’t need a calculator, logarithms book or a paper-pencil.” He explained the way to find the height of the building.

“This problem can be solved using Trigonometry. For the benefit of Sunil, Hema and Sagar, who just completed Algebra, I am explaining the basics of Trigonometry. I might ask you some questions in between to check whether you are understanding. Listen, carefully ...”, he paused a minute and continued “Trigonometry deals with Triangles – Especially the ratio of sides to angles in a triangle. The angle is always proportional to the side opposite to it. For example, imagine a triangle ABC (A, B, C being the vertices) – for which BC (represented by a) is opposite side of angle A, CA (represented by b) is opposite side of angle B and AB (represented by c) is the opposite side of angle C. Now $a/\sin A = b/\sin B = c/\sin C$.”

“What is Sine B?” asked Hema and Sagar spontaneously.

“Coming to the point!” said Vivek and continued, “How many of you know Right angled triangle?” Everyone of them raised their hands indicating they know it.

“Sunil, can you explain a what a right angled triangle is ...”

“A triangle having a right angle.”, replied Sunil. Rest of the kids smiled. Hema raised her hand requesting Vivek to give her a chance. Vivek gave her a Green signal to proceed.

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Hema explained “A right angled triangle consists of one 90° angle and one side is longer compared to other two sides.”

Vivek asked immediately “Can you name that side?”

Hema replied “I do not know. But my teacher showed me right angled triangle type tool in geometry tool box and said in right angled triangle, the side opposite to right angle is longer.”

Vivek then asked Malavika to explain. She started explaining. “In a right angled triangle, the side opposite to 90° is called Hypotenuse. In a right angled triangle, the square of hypotenuse is equal to the sum of the squares of the other two sides.”

“Well done!” said Vivek and asked “If there are two right angles in a triangle, how do we find the longest side?”

Sudhakar responded quickly “Impossible! In a triangle sum of the three angles is 180° . So two angles can't be 90° each.”

Vivek clapped and said “Great job Sudha! Now can you explain Sine of an angle?”

“Sine of an angle A is Opposite side divided by Hypotenuse.” Said Sudhakar.

“Let me draw picture and explain.” Said Vivek.

We invite your feedback

Rather than explaining concepts as a lecture, interactive sessions are always productive. Keeping that in mind, this article is presented in this way. Please feel free to provide us feedback. The ultimate goal is to do something in a useful way. Hope this type of presentation make kids read enthusiastically.

(Let us continue in the next issue, till then good bye!)