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Trignometry

Define ratios in a right ange triangle

Consider a right angle triangle ABC having right angle at B as shown in the following figure. Then, trignometric ratios of the $\angle A$ in right angle ABC are defined as follows:

- *$sine$ of $\angle A = sin A$ = length of the side opposite to $\angle A$ / Length of hypotaneous = $\frac {BC}{AC}$*
- *$cosine$ of $\angle A = cos A$ = length of the side adjacent to $\angle A$ / Length of hypotaneous = $\frac {AB}{AC}$*
- *$tangent$ of $\angle A = tan A$ = length of the side opposite to $\angle A$ / length of the side adjacent to $\angle A$ = $\frac {BC}{AB}$*

Problem 1:

Find i) sin C ii) cos C and iii)tan C for the triangle below:

Solution:

by using Pythagoras theorem,

> $AC^2 = (AB)^2 + (BC)^2$
> $(13)^2 = (AB)^2 + (5)^2$
> $169 = AB^2 + (25)$
> AB^2 = (169) – (25)
> $AB^2 = 144$
> $AB=\sqrt144$
> $AB = 12 cm$
> Therefore
> sin C = $\frac{AB}{AC} = \frac{BC}{AC}$
> sin C = $\frac{12}{13} = \frac{5}{13}$
>
> tan C = $\frac{AB}{BC}$
> tan C = $\frac{12}{5}$

Problem 2:

In a triangle XYZ, ∠Y is right angle, XZ = 17cm and YZ = 15cm, then Find (i) sin X (ii) cos Z and (iii) tan X in the triangle

Solution:

by using Pythagoras theorem,
$(XZ)^2 = (XY)^2 + (YZ)^2
$(17)^2 = (XY)^2 + (15)^2$
$(289) = (XY)^2 + (225)$
$(XY)^2$ = 289 – 225
$(XY)^2 = 64$
$XY = \sqrt64$
$XY = 8 cm$
$sin X = \frac{YZ}{XZ} = \frac{YZ}{XZ}$
$sin X= \frac{15}{17} = 1517$
$tan X = \frac{YX}{XZ}$
$tan X = 158$