

The Cosine Ratio

The complimentary sine ratio is the sine ratio applied to the complimentary angle.

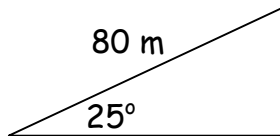
The cosine function on your calculator:

- converts an angle into its complimentary angle
- converts the complimentary angle into its opposite side length (in a unit triangle)

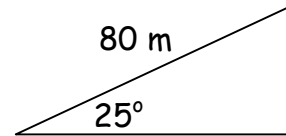
Therefore, the cosine ratio allows us to take a shortcut while using the sine ratio.

Example – Determine the length of the base of the following right angle triangle:

a) using the sine ratio

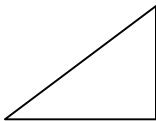


b) using the cosine ratio

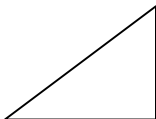


Summary:

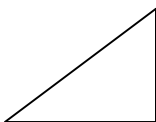
The sine function converts an angle into the opposite side length in a unit triangle.



The cosine function (shortcut) applies the sine function to a complimentary angle.



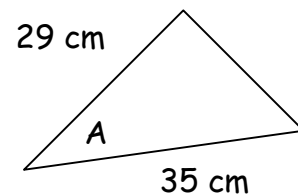
The tangent function (shortcut) divides the sine by the cosine to determine slope.



The inverse cosine function on your calculator is the opposite operation of the cosine function. It converts the adjacent side length (in a unit triangle) into an angle.

Example – Determine the angle of elevation in a right triangle that has a base of 11 m and a hypotenuse of 40 m.

Example – Determine the indicated angle in the following right angle triangle.



When the hypotenuse is unknown:

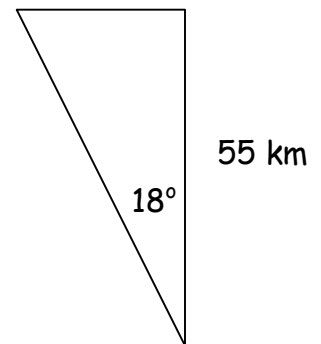
a) we can apply the two basic concepts:

- slope: the tangent of an angle is opposite side divided by adjacent side
- hypotenuse: the Pythagorean theorem

b) we can apply one shortcut (if we can also solve a reciprocal equation):

- the sine or cosine ratio

Example – Determine the length of the hypotenuse in the following right angle triangle.



Homework – Please complete questions # 4, 7, 9, 10bfg, 11, 12a on page 373.