

The Cosine Ratio

Lesson objectives

- I know how to identify the opposite, adjacent, and hypotenuse of a right triangle
- I know how to use the sine and cosine ratios to calculate a side length
- I know how to use the sine and cosine ratios to calculate an angle

1.1

Lesson objectives

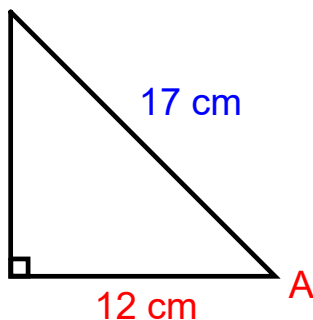
Teachers' notes

Lesson notes

MHR Page 372 #s 1bdfh, 2ace, 4bdfh, 7bdfhjl, 11, 14, 23, & 25

In the last section, we looked at the tangent ratio. Again we will look to find a missing angle or side length of a triangle, this time, using the sine ratio:

$$\cos \theta = \frac{adj}{hyp}$$

Have: **adj**, **hyp**

Need: angle A

Use: cos

$$\cos \theta = \frac{adj}{hyp}$$

$$\cos(A) = \frac{12}{17}$$

$$A = \cos^{-1}(12 \div 17)$$

$$A = 45.1^\circ$$

Have: **adj**, **hyp**

Need: angle B

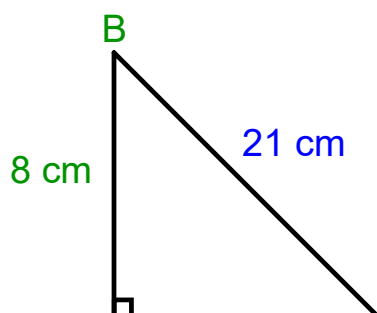
Use: cos

$$\cos \theta = \frac{adj}{hyp}$$

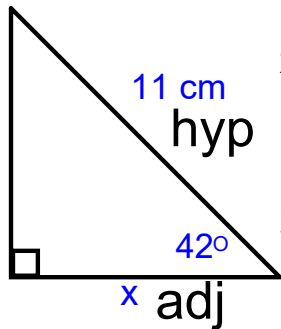
$$\cos(B) = \frac{8}{21}$$

$$B = \cos^{-1}(8 \div 21)$$

$$B = 67.6^\circ$$



Example: Determine the length of the missing side



1. Label your sides
2. Fill in
Have:
Need:
Use:
3. Sub and solve!

Have: angle, hyp

Need: adj

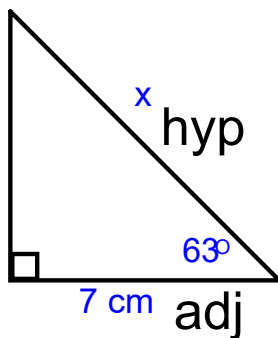
$$\text{Use: } \cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\cos(42) = \frac{x}{11}$$

$$11 \cos(42) = x$$

$$8.2 \text{ cm} = x$$

Example: Determine the measure of the missing side



1. Label your sides
2. Fill in
Have:
Need:
Use:
3. Sub and solve!

Have: adj, angle

Need: hyp

$$\text{Use: } \cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\cos(63) = \frac{7}{x}$$

$$\frac{x \cos(63)}{\cos(63)} = \frac{7}{\cos(63)}$$

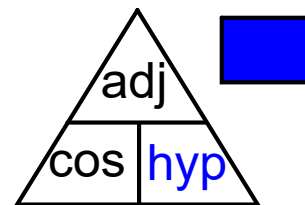
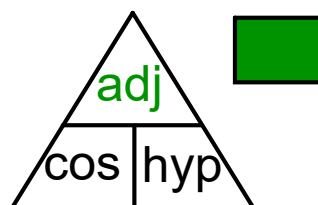
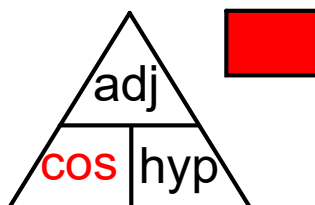
$$x = 15.4 \text{ cm}$$

You can use a formula triangle to help to solve trig problems.

Fill in the triangle with the appropriate variables and cover up what you are solving for. The remaining variables will tell you what to do mathematically:

If they are on the same line, multiply; above one another you divide.

Examples



If solving for the angle cover up cos ... so you divide the adjacent by the hypotenuse.

If solving for the adjacent cover up adj ... so you multiply the hypotenuse by the cosine of the angle.

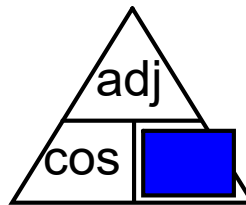
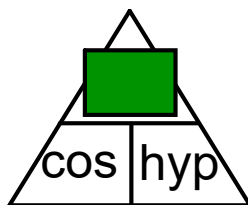
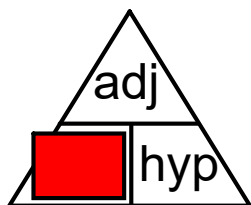
If solving for the hypotenuse cover up hyp ... so you divide the adjacent by the cosine of the angle.

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If solving for the adjacent cover up adj ... so you multiply the hypotenuse by the cosine of the angle.

If solving for the hypotenuse cover up hyp ... so you divide the adjacent by the cosine of the angle.