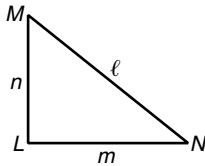


Date _____

Dear Family,

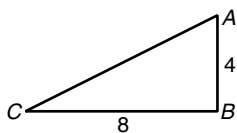
In this chapter, your child will learn about right triangles and trigonometry.

Your child will learn three trigonometric ratios commonly used to find the relationships of angles and the lengths of sides in right triangles. Look at the right triangle below and then consider the ratios presented in the table that follows.



Ratio	Definition	Ratio
sine	the ratio of the length of the leg opposite the angle to the length of the hypotenuse	$\sin N = \frac{\text{opposite leg}}{\text{hypotenuse}} = \frac{n}{\ell}$ $\sin M = \frac{\text{opposite leg}}{\text{hypotenuse}} = \frac{m}{\ell}$
cosine	the ratio of the length of the leg adjacent to the angle to the length of the hypotenuse	$\cos N = \frac{\text{adjacent leg}}{\text{hypotenuse}} = \frac{m}{\ell}$ $\cos M = \frac{\text{adjacent leg}}{\text{hypotenuse}} = \frac{n}{\ell}$
tangent	the ratio of the length of the leg opposite the angle to the length of the leg adjacent to the angle	$\tan N = \frac{\text{opposite leg}}{\text{adjacent leg}} = \frac{n}{m}$ $\tan M = \frac{\text{opposite leg}}{\text{adjacent leg}} = \frac{m}{n}$

Your child will then be able to solve problems involving right triangles by using either the Pythagorean Theorem or the trigonometric ratios.



Pythagorean Theorem

$$\begin{aligned}
 AC^2 &= AB^2 + BC^2 \\
 &= (4)^2 + (8)^2 \\
 &= 16 + 64 = 80
 \end{aligned}$$

So $AC = \sqrt{80} \approx 8.9$.

Trigonometric Ratios

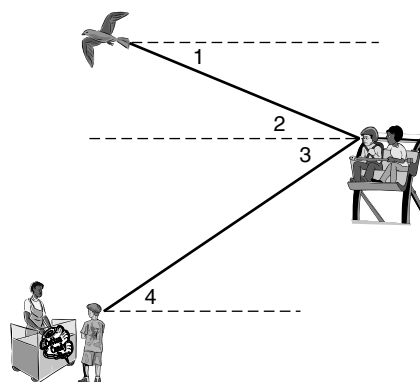
$$\begin{aligned}
 \tan A &= \frac{8}{4} = 2 \\
 m\angle A &= \tan^{-1}(2) \\
 m\angle A &\approx 63^\circ
 \end{aligned}$$

Since $m\angle B = 90^\circ$, $m\angle C \approx 27^\circ$.

Your child will also learn to identify the angles of elevation and angles of depression in a figure.

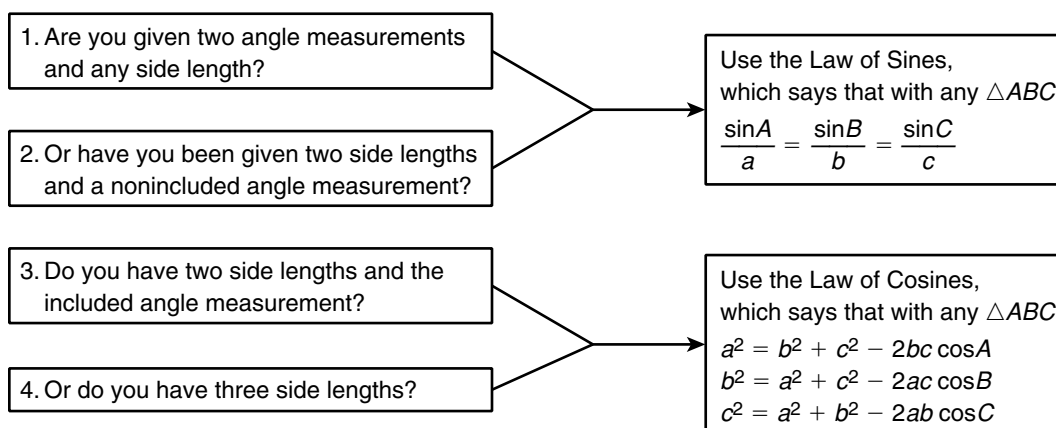
The **angle of elevation** is the angle formed by a horizontal line and a line of sight to a point above the line. For example, in this diagram, $\angle 2$ is an angle of elevation for the student on the Ferris wheel. He is looking up at the bird.

The **angle of depression** is the angle formed by a horizontal line and a line of sight to a point below the line. In this diagram, $\angle 1$ is an angle of depression for the bird. The student on the Ferris wheel can look down at his friend along $\angle 3$.



Your child will learn steps used to decide when to use the Law of Sines and when to use the Law of Cosines to solve a problem.

The steps are as follows:



Your child will also learn about vectors. He or she will learn that vectors can be described in a variety of ways, as seen in the table below.

Term	Diagram or Example
initial point, terminal point	<p>initial point</p> <p>terminal point</p>
component form	<p>initial point</p> <p>terminal point</p> <p>$\vec{XY} = \langle 5, 3 \rangle$</p>
magnitude	<p>\vec{XY} means length of</p> <p>$\vec{XY} = \sqrt{5^2 + 3^2} = \sqrt{34} \approx 5.8$</p>

For additional resources, visit go.hrw.com and enter the keyword MG7 Parent.