

# Trigonometry & Scientific Calculators APPs

## 三角函数式&科学计算器应用程序

### Introduction 简介

Understanding how to to create properly formatted equations in a document is an important skill; however, you should also be able to understand how to use these formulas to solve for missing variables as well.

理解如何在文档中创建格式正确的方程式是一项重要技能，能够理解如何使用这些公式来解决缺少变量也是同样重要。

In this project you will create a Trigonometry formula reference guide which will help you in your math classes; however some of the values in the example are missing. You will need to solve for these missing variables using the scientific calculator on your computer. You can use either the free calculator that is preinstalled on your computer, or you can use one of the many free online scientific calculators.

在此项目中，你将创建一个在数学课上非常有用的三角函数参考公式；但是，示例中缺少一些值。你需要使用电脑上的科学计算器来解决这些缺失的变量。可以使用预装在电脑上的免费计算器，也可以使用许多免费在线科学计算器。

**Try using one of these online resources to complete your project:**  
**尝试使用以下资源：**

[web2.0calc.com](http://web2.0calc.com)  
<http://www.wolframalpha.com>

This project has 6 formulas in total. There are the 3 standard Trig Ratios which include **“Sine”**, **“Cosine”** and **“Tangent”**, and 3 the Inverse Ratios which include **“Cosecant”**, **“Secant”**, and **“Cotangent”**. The table below shows how the corresponding **“Inverse Ratios”** are created from its corresponding **“Trig Ratio”**.

本项目共有6个公式。有3个标准三角比，包括“正弦”、“余弦”和“正切”，还有3个反比，包括“余割”、“正割”和“余切”。下表显示了如何从相应的“三角比”创建相应的“反三角比”。

**Note:** *It is important to understand the process used to create the **“Inverse Ratios”** since some scientific calculators do not have dedicated **“Cosecant”**, **“Secant”**, and **“Cotangent”** functions. When a calculator dose not have dedicated functions for the **“Inverse Ratios”**, you will need to solve for the variable using the Inverted Ratio shown in the second column.*

**注：**由于一些科学计算器没有专用的“余割”、“正割”和“余切”函数，因此理解创建“反比”的过程非常重要。当计算器没有“反比率”的专用函数时，需要使用第二列中显示的反比率求解变量。

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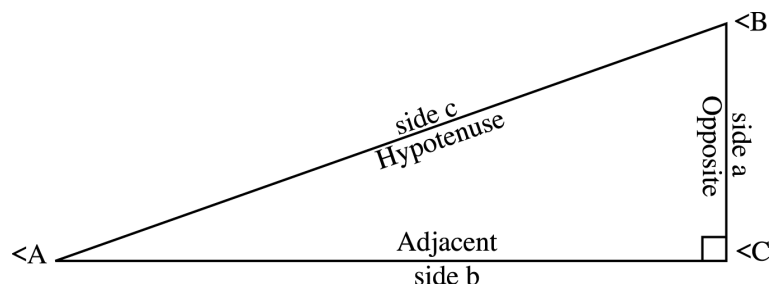
Original Ratio	(Process) Inverted Ratio ⇒	Inverse Ratio
<p><b>Sine</b></p> $\sin(A) = \frac{\textit{Opposite}}{\textit{Hypotenuse}}$	$\frac{1}{\sin}(A) = \frac{\textit{Hypotenuse}}{\textit{Opposite}}$	<p><b>Cosecant</b></p> $\textit{csc}(A) = \frac{\textit{Hypotenuse}}{\textit{Opposite}}$
<p><b>Cosine</b></p> $\cos(A) = \frac{\textit{Adjacent}}{\textit{Hypotenuse}}$	$\frac{1}{\cos}(A) = \frac{\textit{Hypotenuse}}{\textit{Adjacent}}$	<p><b>Secant</b></p> $\textit{sec}(A) = \frac{\textit{Hypotenuse}}{\textit{Adjacent}}$
<p><b>Tangent</b></p> $\tan(A) = \frac{\textit{Opposite}}{\textit{Adjacent}}$	$\frac{1}{\tan}(A) = \frac{\textit{Adjacent}}{\textit{Opposite}}$	<p><b>Cotangent</b></p> $\textit{cot}(A) = \frac{\textit{Adjacent}}{\textit{Opposite}}$

**Special Note:** There can only be one **“Co”** per **“Trig Ratio”** pair.  
 注意：每一组“三角比”只有一个Co

### Labeling Trigonometric Diagrams 标记三角图

When Labeling a **Triangle** we should use LARGE letters to label the **Angles**, and small letter to label the three sides of a Triangle. In order to make it easier for use to learn **Trigonometric Equations** a standard labeling convention is used. We start with the smallest **Angle** in a **Triangle**. This angle is referred to as **Angle A** or **“<A”** for short. **“Side a”** is **“Opposite”** to **“<A”**. **Angles** are labeled in order of size, with the largest **“Angle”** being **“<C”**. Therefore if we are solving for **“<A”** then **“side a”** is the **“Opposite”**, **“side b”** is the **“Adjacent”**, and **“side c”** is the **“Hypotenuse”**.

在标记三角形时，我们应该用大号字母标记角度，用小写字母标记三角形的三条边。为了便于学习三角方程，在此使用了标准的标记方法。我们从三角形中的最小角度开始。该角度简称为角度A或“<A”，“a面”与“<a”相对。角度按大小顺序标记，最大“角度”为“<C”。因此，如果求解“<A”，那么“a面”在“对边”，b面是“邻边”，c面是“斜边”。



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### Solving Trig Ratios 求三角比

If we want to solve for “ $\angle A$ ” and we know the length of “side a” and “side b” then we would need to use the “Tangent formula”. We use this formula because of the variables that we already know and can use to solve for the missing angle. Solve the equation if:

如果求“ $\angle A$ ”，且知道“a面”和“b面”的长度，那么需要使用“正切公式”。我们之所以使用这个公式，是因为我们已经知道了一些变量，可以用来求解缺失的角度。如果满足以下条件，则求解方程：

$$\begin{array}{l} \angle A = \text{Unknown} \\ \text{Side a} = 1\text{cm} \\ \text{Side b} = 3\text{cm} \end{array} \quad \tan(A) = \frac{\textit{Opposite}}{\textit{Adjacent}}$$

If you entered the equation into your calculator correctly you should have got the answer “ $\angle A = 18.43^\circ$ ”. Can you determine the the value for “ $\angle B$ ” on your own?

如果将方程式正确输入计算器，应该得到答案“ $\angle A = 18.43^\circ$ ”。那“ $\angle B$ ”的值应该是多少呢？

### Converting Degrees to Radians 将度转换为弧度

When solving Trigonometric equations you should also be aware of if you are solving the equations using “Degrees” or “Radians”. Either method is fine, but you need to make sure that if you are using a measurement of an “Angel” that you have selected “Degrees” on your calculator; however, some calculators will require you to covert “Degrees” to “Radians” so it is important to know how to do this conversion. In order to convert degrees to radians to solve Trigonometric equations you need to use the formula:

在求解三角方程时，还应注意使用“度”或“弧度”求解方程。这两种方法都可以，但是如果你使用的是“角度”的测量，你需要确保你已经在计算器上选择了“度”；但是，有些计算器需要将“度”转换为“弧度”，因此了解如何进行此转换非常重要。为了将度转换为弧度以求解三角方程，需要使用以下公式：

$$\textit{Radian} = \frac{m\angle A\pi}{180}$$

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### Additional Resources 额外资源

If you are using a word processor that does not have a formula editor tool, you can create formulas and export them as an image for free at:

如果你使用的文字处理器没有公式编辑器工具，可以通过以下链接以图片的形式免费导出创建的公式：

<http://www.codecogs.com/latex/eqneditor.php>

You can also use the WolframAlpha Conceptual Knowledge Engine to research different topics related to the math and sciences. You can solve equations by entering them into the search field, or you can search for answers on a topic question as well. The website for WolframAlpha is:

还可以使用WolframAlpha概念知识引擎来研究与数学和科学相关的不同主题，在搜索区输入方程或搜索主题问题的答案。WolframAlpha的网站是：

<http://www.wolframalpha.com>

# Trigonometry & Scientific Calculators APPs

## 三角函数式&科学计算器应用程序

### Project Instructions 项目说明

-Change the document type to A4

将文档类型更改为A4

-Create an MLA formatted document that has:

创建具有以下内容的MLA格式文档：

- A header with your last name auto page #
- 带有本人姓氏的页眉自动页面#
- A project leader with your full name, teacher, class and date
- 项目左上角包含以下：姓名、老师、班级和日期
- A project title
- 项目名称
- A footer with the schools name
- 带有学校名称的页脚

-Use tables to effectively organize information

使用表格有效地组织信息

-Insert all required diagrams in the correct locations

在正确的位置插入所有必需的图表

-Format objects using the “properties” window

使用“属性”窗口格式化对象

-Use the formula editor tool to create all required formulas

使用公式编辑器工具创建所有必需的公式

-Practice using a scientific calculator on the computer

在电脑上练习使用科学计算器

-Use the correct Trig Ratio to solve for “<A” , “<B” , and side “c”

使用正确的触发比求解“<A”、“<B”和“c”侧

-Use the correct Inverse Ratio to solve for side “c” in the second example

使用正确的反比求解第二个示例中的“c”侧

-Round all answers to 2 decimal places.

将所有答案四舍五入至小数点后2位

**NOTE:** When solving for side “c” in the second example you will need to determine what settings your calculator has. You may need to manually convert “Degrees” to “Radians”, and you might also need to use the “Inverted Form” of the formula or rewrite the “Inverse Ratio” to solve for this variable. If you need help you should ask the the teacher.

注：在第二个示例中，当求解“c”面时，需要确定计算器的设置，可能需要手动将“度”转换为“弧度”，还可能需转换公式或重写“反比”来求解此变量。如需帮助，咨询老师。

**When you are done your assignment save the document as:**

**按照以下格式命名文档：**

**“First Name”\_“Last Name”\_Trigonometry.docx**

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## 三角函数式&科学计算器应用程序

Project: Trigonometry Ratios 项目：三角比

Last Name 1

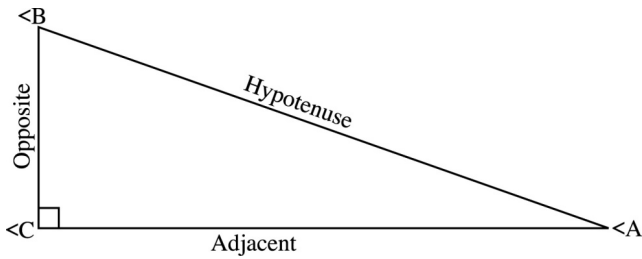
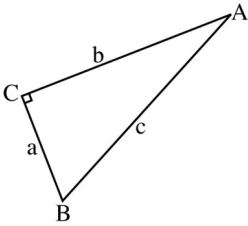
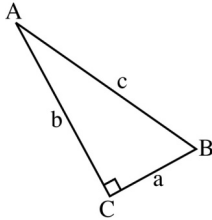
Name:

Teacher:

Class:

Date:

### Trigonometry Ratios

	
$\sin A = \frac{\textit{Opposite}}{\textit{Hypotenuse}}$	 <p><math>\angle A = \dots^\circ, \angle B = \dots^\circ, \angle C = 90^\circ</math>  <math>a = 2.00\text{cm}, b = 4.00\text{cm}, c = \dots\text{cm}</math></p>
$\cos A = \frac{\textit{Adjacent}}{\textit{Hypotenuse}}$	
$\tan A = \frac{\textit{Opposite}}{\textit{Adjacent}}$	
$\csc A = \frac{\textit{hypotenuse}}{\textit{Opposite}}$	 <p><math>\angle A = 26.57^\circ, \angle B = 63.43^\circ, \angle C = 90^\circ</math>  <math>a = 1.75\text{cm}, b = 3.50\text{cm}, c = \dots\text{cm}</math></p>
$\sec A = \frac{\textit{hypotenuse}}{\textit{Adjacent}}$	
$\cot A = \frac{\textit{Adjacent}}{\textit{opposite}}$	
<p><b>Remember Your Standard Trig Ratios Easily:</b>  <b>SOH - CAH - TOA</b></p>	

Footer Section (School Name Goes Here)