**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Instructor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Term: \_\_\_\_\_\_\_\_\_\_\_\_\_\_**

* General Guidelines and Grading
	+ Throughout the semester there will key concepts that will be included in this notebook. A table of contents with page numbers will be kept and updated in class. The notebook will be scored on a 100 point basis.
	+ Notebooks will be graded COMPETITIVELY(see note below) based on the following
1. Quality
2. Accuracy
3. Organization
4. Neatness
5. Completeness

Note: Competitively implies those notebooks following the five criteria above “best” will receive the highest scores.

* + The notebook will be checked at various points during the semester. Points will be awarded each time the notebook is checked. These dates will be announced in class.
	+ You will have a chance to correct and alter your notebook and resubmit it for a final time. It will be graded one last time based on correctness, neatness, and usability for future classes.
		- This notebook should be your BEST work. As a general guideline anyone in a Trigonometry course (or beyond) should to be able to read and understand your material.
		- The notebook will at this point be graded on a competitive scale.
		- If you choose to redo any pages of the notebook (recommended) please include the graded page in front of EACH corrected page so that I can view your old work and your revised work on a page by page basis. Otherwise just include the non-corrected page.
		- Only exceptionally correct, useable, and visually impressive notebooks will receive full credit.

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**[Define sine and cosine](#TOC)**. Label triangle below using $θ$, x, y and r. Be sure to indicate if it is a right triangle.

**[Define tangent, cotangent, secant, cosecant using sine, cosine](#TOC)**, as well as by using the terms “opposite”, “adjacent”, “hypotenuse”, and thirdly, as well as in terms of $θ, x, y $and$ r$ as referenced above.

**[Trigonometric Table](#TOC)**

Complete the Trigonometric Table.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Deg  | Ref  | Quadrant | Radians | cos θ | sin θ | tan θ | sec θ | csc θ | cot θ |
| -90 |  |  |  |  |  |  |  |  |  |
| -60 |  |  |  |  |  |  |  |  |  |
| -45 |  |  |  |  |  |  |  |  |  |
| -30 |  |  |  |  |  |  |  |  |  |
| 0  | 0 |  | 0 | 0 | 1 |  |  |  | 0 |
| 30 | 30 |  |  |  |  |  |  |  |  |
| 45  | 45 |  |  |  |  |  |  |  |  |
| 60  | 60 |  |  |  |  |  |  |  |  |
| 90  | 90 |  |  |  |  |  |  |  |  |
| 120  | 60 |  |  |  |  |  |  |  |  |
| 135  | 45 |  |  |  |  |  |  |  |  |
| 150 | 30 |  |  |  |  |  |  |  |  |
| 180 | 0 |  |  |  |  |  |  |  |  |
| 210 | 30 |  |  |  |  |  |  |  |  |
| 225 | 45 |  |  |  |  |  |  |  |  |
| 240 | 60 |  |  |  |  |  |  |  |  |
| 270 | 90 |  |  |  |  |  |  |  |  |
| 300 | 60 |  |  |  |  |  |  |  |  |
| 315 | 45 |  |  |  |  |  |  |  |  |
| 330 | 30 |  |  |  |  |  |  |  |  |
| 360 | 0 |  |  |  |  |  |  |  |  |

# Signs of Functions

# Fill in the [**sign for each trig function’s value**](#TOC)**:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Quadrant | X axis (adj side) | Y axis (opp side) | $$Sin(θ)$$ | $$Csc(θ)$$ | $$Cos(θ)$$ | $$Sec(θ)$$ | $$Tan(θ)$$ | $$Cot(θ)$$ |
| 1 | +  | +  |  |  |  |  |  |  |
| 2 | -  | +  |  |  |  |  |  |  |
| 3  | -  | - |  |  |  |  |  |  |
| 4  | +  | - |  |  |  |  |  |  |

# **[Domains and ranges of functions](#TOC)**

Fill in each blank

|  |  |  |
| --- | --- | --- |
| Function | Domain | Range |
| $$Sin(θ)$$ |  |  |
| $$Cos(θ)$$ |  |  |
| $$Tan(θ)$$ |  |  |
| $$Csc(θ)$$ |  |  |
| $$Sec(θ)$$ |  |  |
| $$Cot(θ)$$ |  |  |
| $$Sin^{-1}(x)$$ |  |  |
| $$Cos^{-1}(x)$$ |  |  |
| $$Tan^{-1}(x)$$ |  |  |

## **[Inverse Trig Function Restrictions](#TOC)**

Fill in restrictions ***on the domain of each*** of the listed ***functions*** so that the inverse of each will itself be a function. Then fill in the corresponding range for each.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
| Domain |  |  |  |  |  |  |
| Range |  |  |  |  |  |  |

## **[Unit Circle](#TOC).**

For each ‘key’ point on the unit circle, include the degrees, radians, and coordinates of the associated points.



**[Graph](#TOC)** [$y = sin x$](#TOC) **[and](#TOC)** [$y = csc x$](#TOC) **[on same graph over interval [-2π, 2π].](#TOC)** Choose appropriate scale and label. Give the domain and range of each function. Show asymptotes for the $y = csc x$ graph.



**[Graph y = cos x and y = sec x on same graph over interval [-2π, 2π]](#TOC)**. Choose appropriate scale and label. Give the domain and range of each function. Show asymptotes for the y = sec x graph.



**[Graph y = tan x over at least 2 periods](#TOC)**. Choose appropriate scale and label. Give the domain and range. Show asymptotes.



**[Graph y = cot x over at least 2 periods](#TOC)**. Choose appropriate scale and label. Give the domain and range. Show asymptotes.



**[Graph y = cos(4x) and](#TOC)** [$y=-3+cos⁡(4x+π)$](#TOC) on same set of axes over at least one period for each function.

## graph_paper_1up**[Graph over at least one period](#TOC). Give domain and range.**



****[**Graph  and on same set of axes over at least one period**](#TOC)**.** Show asymptotes for the cosecant graph.

**[Prove the difference identity for cosine](#TOC).**

Prove: . Include all necessary figures in your sketch below.

## **[Prove the remaining sum and difference identities for sine, cosine, and tangent](#TOC).**

1. 
2. 
3. 
4. 
5. 

**[Write in each identity](#TOC)**.

 Quotient identity: pythagorean identities (all three):

|  |  |  |
| --- | --- | --- |
| cos(-A) = | sin(-A) = | tan(-A) = |

|  |  |
| --- | --- |
| cos(A – B) = | cos(A + B) = |
|  =  |  =  |
| sin(A + B) =  | sin(A – B) = |
| tan (A + B) = | tan (A – B) = |

|  |  |  |
| --- | --- | --- |
| cos 2A =  | cos 2A = | cos 2A = |

|  |  |
| --- | --- |
| sin 2A = | tan 2A = |

|  |  |  |
| --- | --- | --- |
|  = |  = |  = |

Power Reducing Identities:

|  |  |
| --- | --- |
|  |  |

**[Prove these Fundamental Identities](#TOC)**.

1. 
2. 
3. 

Negative angle identities (show sketch to right)

1. 
2. 
3. 

****[**Derive/Prove the laws of sines and cosines**](#TOC). (Include the related diagram.)

 Prove only one law of cosines but list all three.)

## **[Graph y = tan](#TOC)[-1](#TOC)[(x)](#TOC):**

Give the domain and range of y = tan-1(x). Hint: Refer to y = tan x.

Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Graph y = tan-1(x) as follows. Label “y” axis in radians.

1. Choose points within the range of the inverse function.
2. Find y = tan x in table below.
3. Perform the inverse operation (switch x and y)
4. Graph tan-1(x). Show asymptotes. Label points

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x |  |  |  |  | 0 |  |  |  |
| y = tan x |  |  |  |  |  |  |  |  |



## **[Graph y = sec](#TOC)[-1](#TOC)[(x)](#TOC):**

Give the domain and range of y = sec-1(x). Hint: Refer to y = sec x.

Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Graph y = sec-1(x) as follows. Label “y” axis in radians.

1. Choose points within the range of the inverse function.
2. Find y = sec x in table below.
3. Perform the inverse operation (switch x and y)
4. Graph sec-1(x). Show asymptote(s). Label points.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | 0 |  |  |  |  |  |  |  |  |
| y = sec x |  |  |  |  |  |  |  |  |  |



**[Graph the remaining 4 inverse trig functions](#TOC)**. Show any asymptotes. Scale axes. Label points. Give domain and range of each.

