

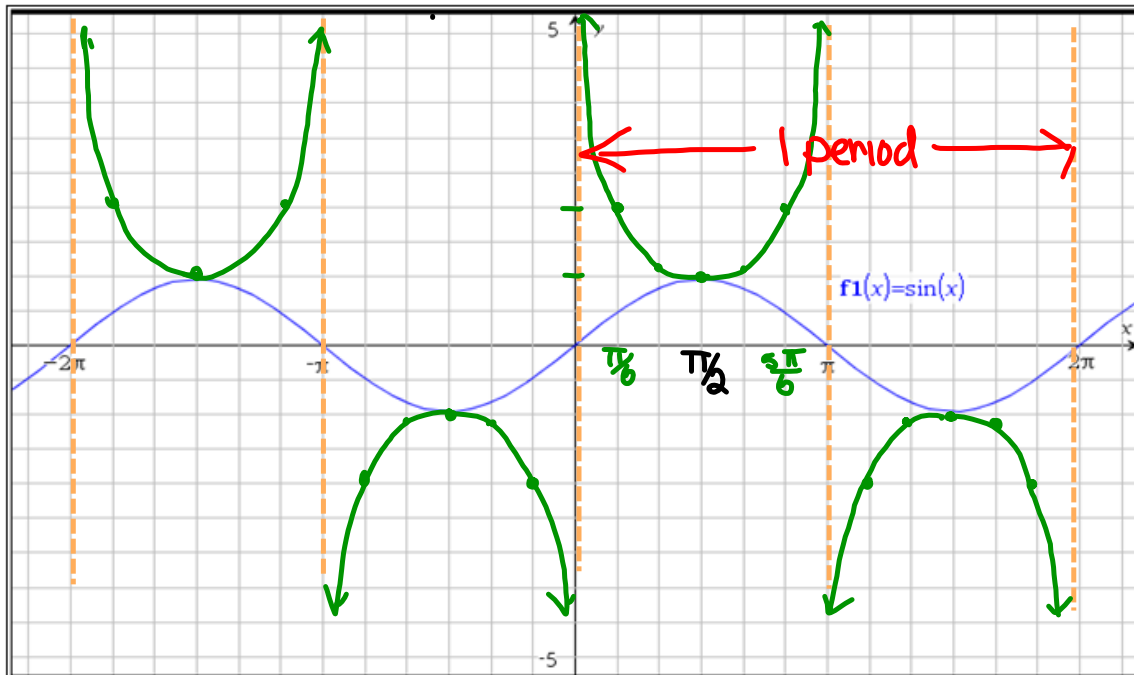
Name _____

Exploring Cosecant and Secant Graphs

1. Using your knowledge of the Sine function and its relation to the Cosecant function, complete the following chart for $f(x) = \csc(x)$.

x	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π
<i>sin(x)</i> (exact value)	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
Decimal approximation of <i>sin(x)</i>	0	0.5	0.707	0.866	1	0.866	0.707	0.5	0
<i>csc(x)</i> (exact value)	undef.	2	$\sqrt{2}$	$\frac{2\sqrt{3}}{3}$	1	$\frac{2\sqrt{3}}{3}$	$\sqrt{2}$	2	undef.
Decimal approximation of <i>csc(x)</i>	undef.	2	1.414	1.156	1	1.156	1.414	2	undef.
x	$\frac{7\pi}{6}$	$\frac{5\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{7\pi}{4}$	$\frac{11\pi}{6}$	2π	
<i>sin(x)</i> (exact value)	$-\frac{1}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	0	
Decimal approximation of <i>sin(x)</i>	-0.5	-0.707	-0.866	-1	-0.866	-0.707	-0.5	0	
<i>csc(x)</i> (exact value)	-2	$-\sqrt{2}$	$-\frac{2\sqrt{3}}{3}$	-1	$-\frac{2\sqrt{3}}{3}$	$-\sqrt{2}$	-2	undef.	
Decimal approximation of <i>csc(x)</i>	-2	-1.414	-1.156	-1	-1.156	-1.414	-2	undef.	

2. Use your decimal approximations to sketch the graph of $f(x) = \csc(x)$ on the coordinate plane below.



3. Use your graph to answer the following questions about the function $f(x) = \csc(x)$:

a. What is the period of the function?

2π

b. What are the domain and range?

D: $(-\infty, \infty)$ except
 R: $(-\infty, -1] \cup [1, \infty)$

c. What is the y-intercept?

NONE

d. What are the x-intercepts?

NONE

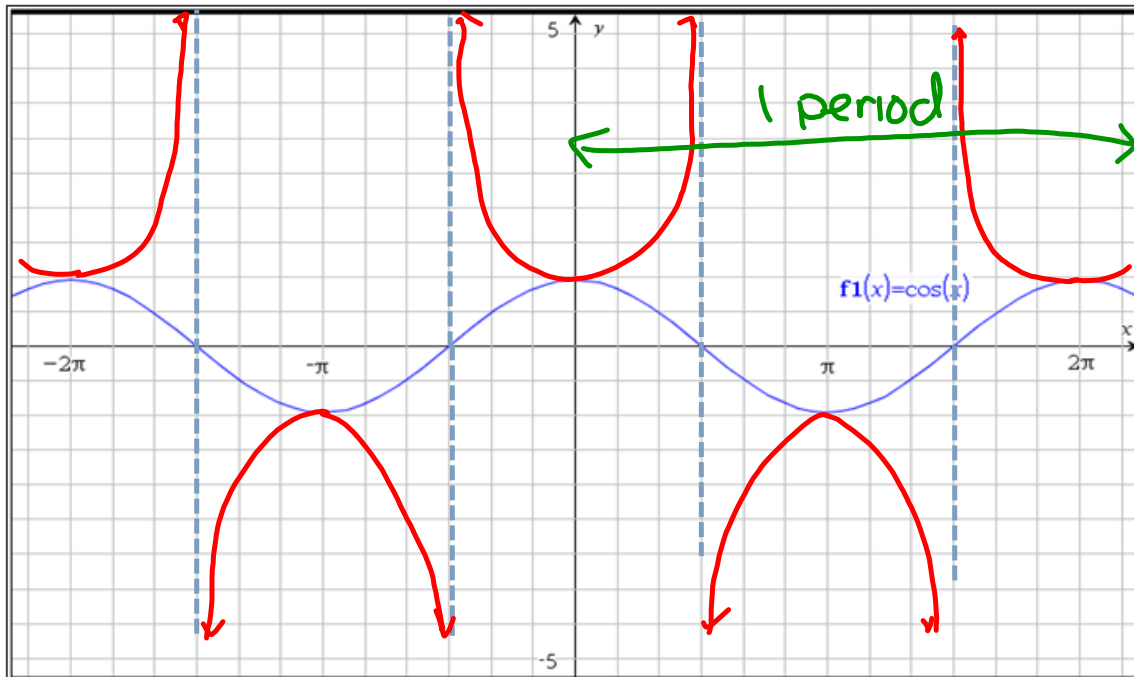
e. What are the maximum and minimum values?

local max $y = -1$
 " min $y = 1$

4. Using your knowledge of the Cosine function and its relation to the Secant function, complete the following chart for $f(x) = \sec(x)$.

x	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π
cos(x) (exact value)	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	-1
Decimal approximation of cos(x)	1	0.866	0.707	0.5	0	-0.5	-0.707	-0.866	-1
sec(x) (exact value)	1	$\frac{2\sqrt{3}}{3}$	$\sqrt{2}$	2	undef.	-2	$-\sqrt{2}$	$-\frac{2\sqrt{3}}{3}$	-1
Decimal approximation of sec(x)	1	1.156	1.414	2	undef.	-2	-1.414	-1.156	-1
x	$\frac{7\pi}{6}$	$\frac{5\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{7\pi}{4}$	$\frac{11\pi}{6}$	2π	
cos(x) (exact value)	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	
Decimal approximation of cos(x)	-0.866	-0.707	-0.5	0	0.5	0.707	0.866	1	
sec(x) (exact value)	$-\frac{2\sqrt{3}}{3}$	$-\sqrt{2}$	-2	undef.	2	$\sqrt{2}$	$\frac{2\sqrt{3}}{3}$	1	
Decimal approximation of sec(x)	-1.156	-1.414	-2	undef.	2	1.414	1.156	1	

5. Use your decimal approximations to sketch the graph of $f(x) = \sec(x)$ on the coordinate plane below.



6. Use your graph to answer the following questions about the function $f(x) = \sec(x)$:

a. What is the period of the function?

2π

b. What are the domain and range?

$D: (-\infty, \infty)$ except for $n \cdot \frac{\pi}{2}$
 $R: (-\infty, -1] \cup [1, \infty)$

c. What is the y-intercept?

$y = 1$

d. What are the x-intercepts?

NONE

e. What are the maximum and minimum values?

Local max $y = -1$ Local min $y = 1$

7. How are the graphs of $\csc(x)$ and $\sec(x)$ similar? How are they different?