

Name: key
Serafino · Precalculus S1

No. _____

Per: 3

Date: _____
M T W R F

3A

Periodic Functions & Sinusoids

Classwork / Homework: graph & analyze Sine, Cosine, Secant and Cosecant functions (ABD)

The Sine Parent Function

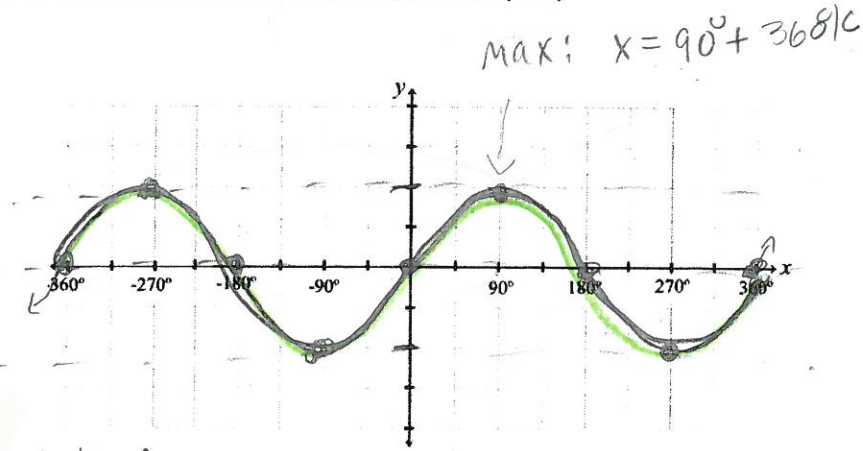
$f(x) = \sin(x)$

Domain: $x \in \mathbb{R}$

Range: $y \in [-1, 1]$

Natural Period: 360°

x-intercepts: $x \in 180^\circ k \leftarrow k \text{ is integer}$



The Cosine Parent Function

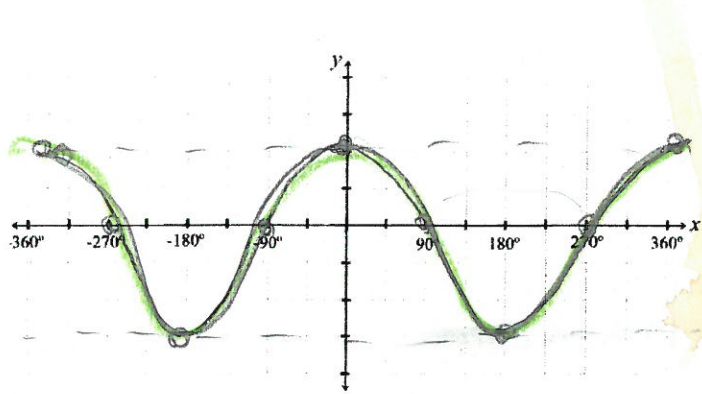
$f(x) = \cos(x)$

Domain: $x \in \mathbb{R}$

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Natural Period: 360°

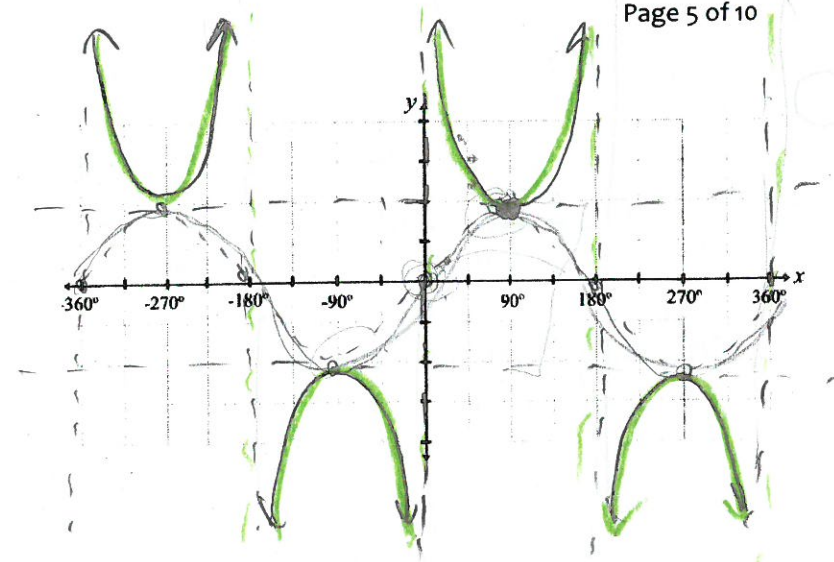
x-intercepts: $x \in \{90^\circ + 180^\circ k\}$



	Sinusoidal Axis	Range	Domain	Frequency	Period	Increment	"Starting Point"
Analyzing Sine & Cosine:	SA: "Midline" b/w max and min	R: The interval of function values from min to max	D: What angles can you take the trig ratio of?	F: How many full cycles completed in the Natural Period	P: The actual length of one full cycle	I: The important SA, max/min points, every 1/4 th of a period	SP: Where is your function
$y = \sin(x)$	$y=0$	$[-1, 1]$	\mathbb{R}	1	360°	90°	$x=0$ on SA
$y = \cos(x)$	$y=0$	$[-1, 1]$	\mathbb{R}	1	360°	90°	$x=0$ above SA

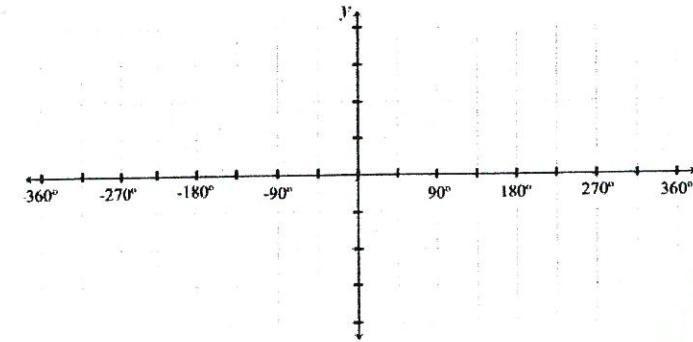
The Cosecant Parent Function
 $f(x) = \csc(x)$

Domain: $x \neq 180^\circ k$
 Range: $y \in (-\infty, -1] \cup [1, \infty)$
 Natural Period: 360°
 x-intercepts: none!



The Secant Parent Function
 $f(x) = \sec(x)$

Domain:
 Range:
 Natural Period:
 x-intercepts:



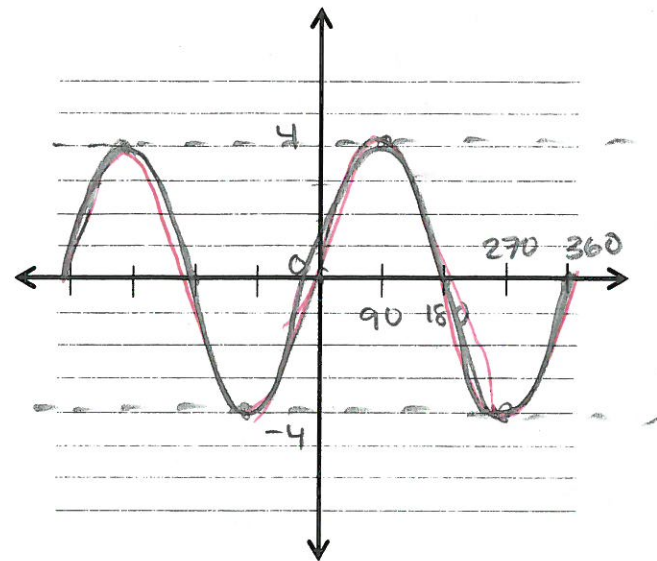
	SA	Range	Domain	Frequency	Period	Increment	"Starting Point"
Secant & Cosecant	SA: "Midline" b/w	R: The interval of ratio values from min to max	D: What angles can you take this ratio of? Or... Where & at what intervals is this function undefined	F: How many full cycles completed in the Natural Period	P: The actual length of one full cycle	I: The important SA, max/min points, every 1/4 th of a period	SP: Where is your function
$y = \csc(x)$							
$y = \sec(x)$							

Period 3

Graph the trig functions.

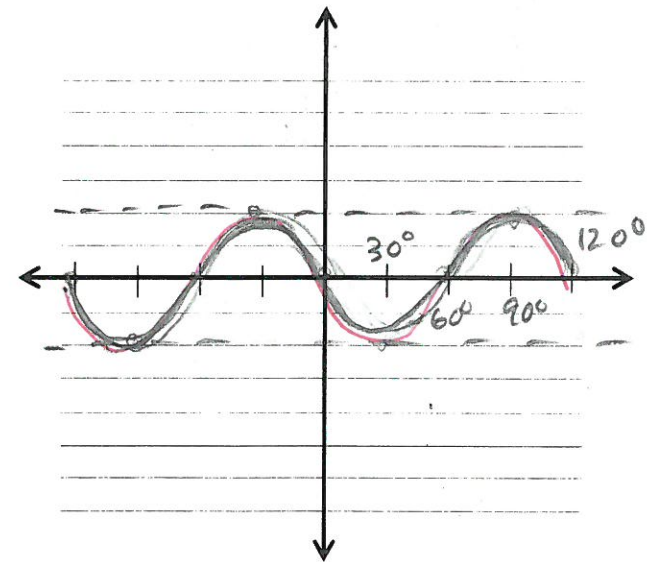
1. $y = 4 \sin(x)$

A	4	SA	$y=0$
D	$x \in \mathbb{R}$		
R	$y \in [-4, 4]$		
P	$B=1 \quad 360^\circ / 1 = 360^\circ$		
I	$360^\circ / 4 = 90^\circ$		



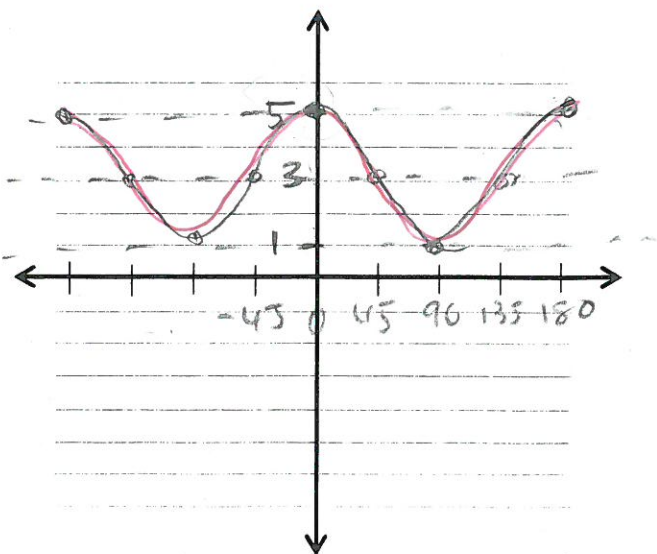
2. $y = -2 \sin(3x)$

A	2	SA	$y=0$
D	$x \in \mathbb{R}$		
R	$y \in [-2, 2]$		
P	$360^\circ / 3 = 120^\circ$		
I	$120^\circ / 2 = 60^\circ$		



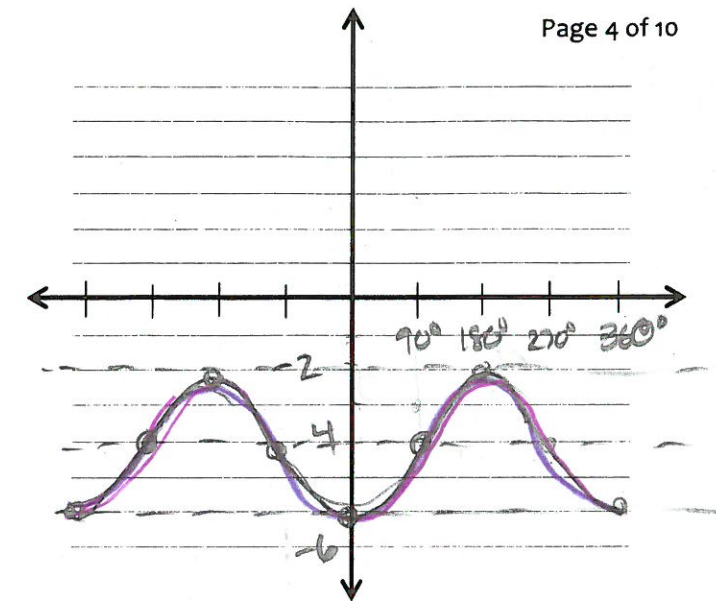
3. $y = 2 \cos(2x) + 3$

A	2	SA	$y=3$
D	$x \in \mathbb{R}$		
R	$y \in [1, 5]$		
P	$360^\circ / 2 = 180^\circ$		
I	$180^\circ / 4 = 45^\circ$		



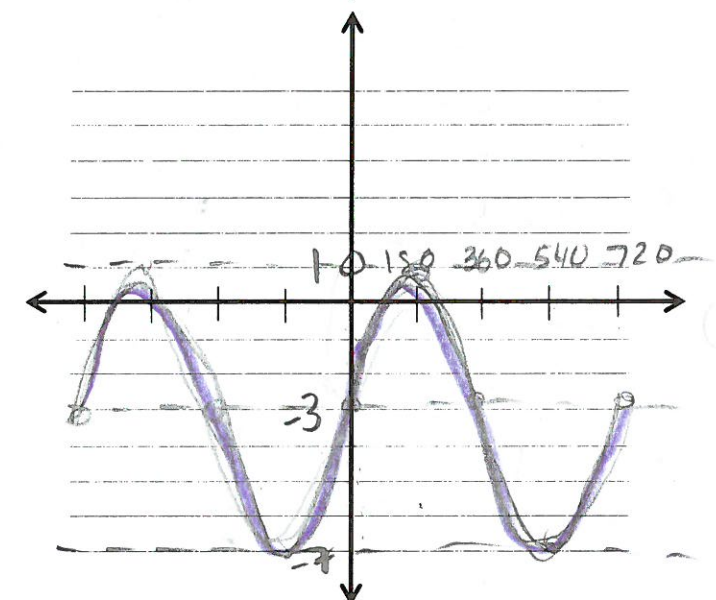
4. $y = -2\cos(x) - 4$

A	2	SA	$y = -4$
D	$x \in \mathbb{R}$		
R	$y \in [-6, -2]$		
P	360°		
I	90°		



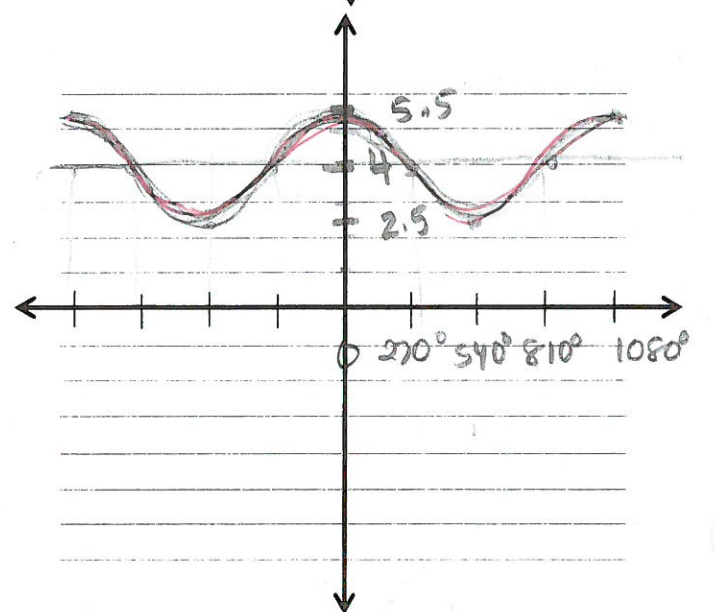
5. $y = 4\sin(1/2 x) - 3$

A	4	SA	$y = -3$
D	$x \in \mathbb{R}$		
R	$y \in [-7, 1]$		
P	$360^\circ / 1/2 = 720^\circ$		
I	$720^\circ / 4 = 180^\circ$		



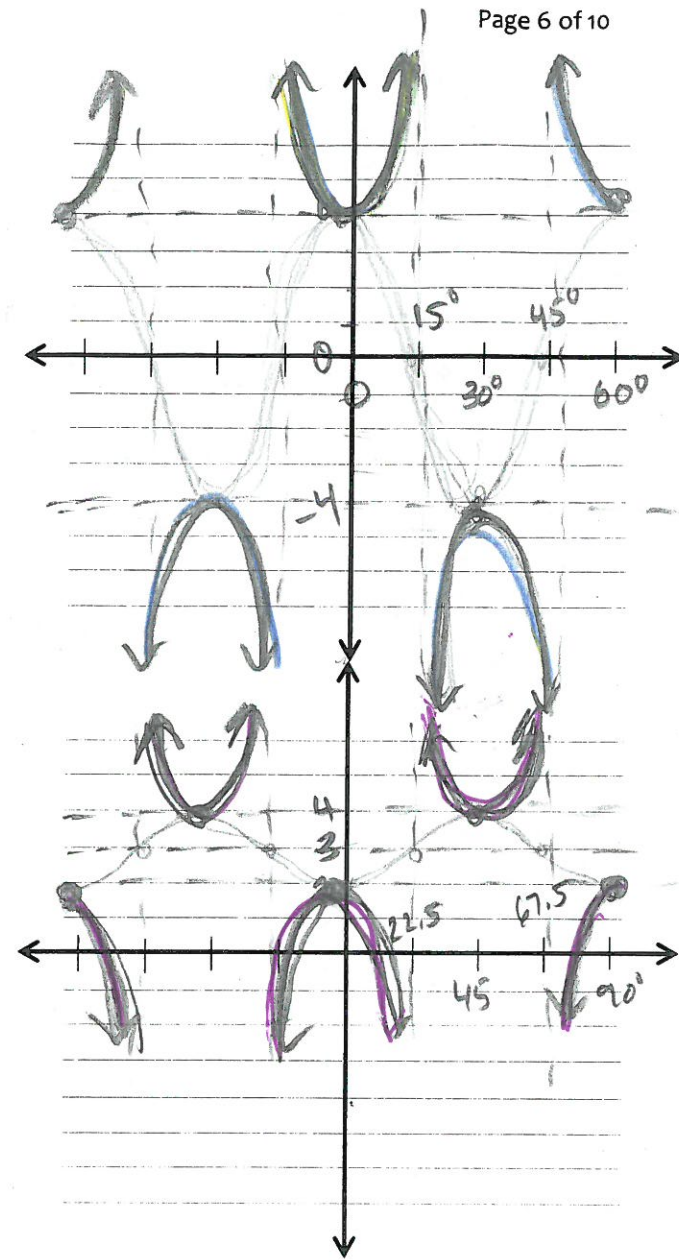
6. $y = 1.5\cos(x/3) + 4$

A	1.5	SA	$y = 4$
F	$1/3$		
P	$360^\circ / 1/3 = 1080^\circ$		
I	$1080^\circ / 4 = 270^\circ$		
D	$x \in \mathbb{R}$		
R	$y \in [2.5, 5.5]$		



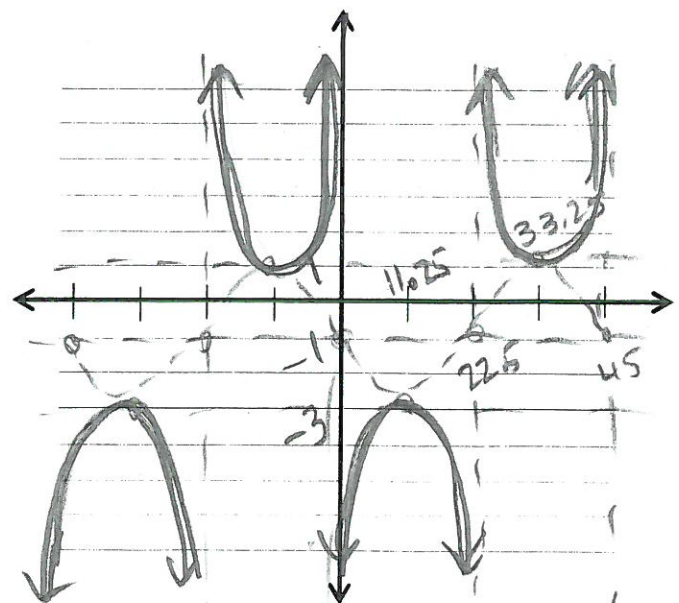
7. $y = 4 \sec(6x)$

A	none	SA	$y=0$
F	6		
P	$\frac{360}{6} = 60^\circ$		
I	$60/4 = 15^\circ$		
D	$x \neq 15^\circ + 30^\circ k$		
R	$y \leq -4$ or $y \geq 4$		



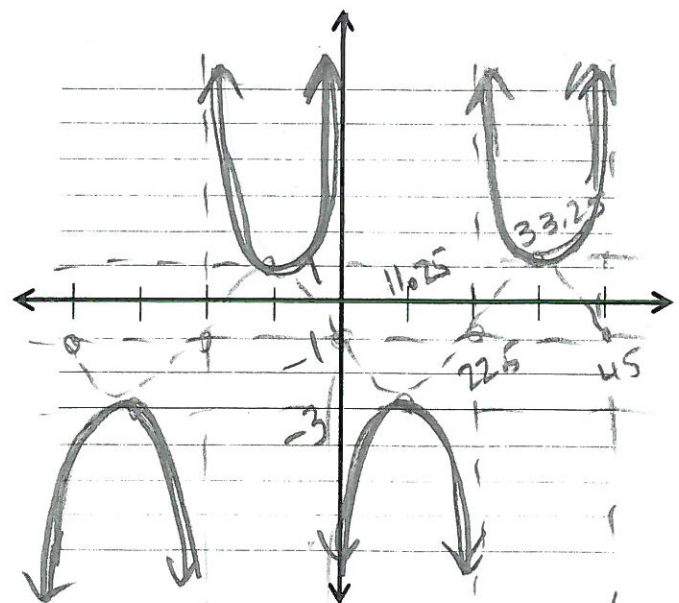
8. $y = 3 - \sec(4x)$

A	none	SA	$y=3$
F	4		
P	$\frac{360}{4} = 90^\circ$		
I	$90/4 = 22.5^\circ$		
D	$x = 22.5^\circ + 45^\circ k$		
R	$y \leq 2$ or $y \geq 4$		



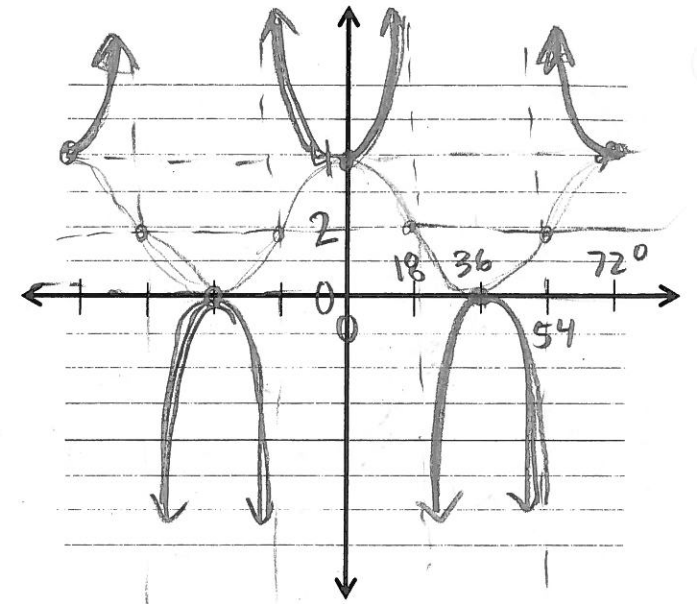
9. $y = -2 \csc(8x) - 1$

A	none	SA	$y=-1$
F	8		
P	$\frac{360}{8} = 45^\circ$		
I	$45/4 = 11.25^\circ$		
D	$x \neq 22.5^\circ k$		
R	$y \leq -3$ or $y \geq 1$		



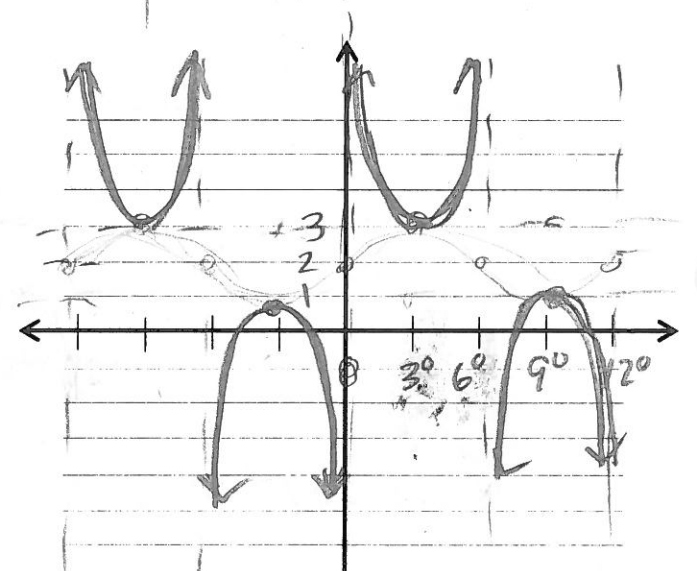
10. $y = 2\sec(5x) + 2$

A	none	SA	$y = 2$
F	5		
P	$\frac{360}{5} = 72^\circ$		
I	$\frac{72}{4} = 18^\circ$		
D	$x \neq 18^\circ + 36^\circ k$		
R	$y \leq 0$ or $y \geq 4$		



11. $y = \csc(30x) + 2$

A	none	SA	$y = 2$
F	$\frac{360}{12} = 30^\circ$		
P	12°		
I	3°		
D	$x \neq 6^\circ k$		
R	$y \leq 1$ or $y \geq 3$		



12. $y = -5\csc(10x)$

A	none	SA	$y = 0$
F	10		
P	$\frac{360}{10} = 36^\circ$		
I	$\frac{36}{4} = 9^\circ$		
D	$x \neq 18^\circ k$		
R	$y \leq -5$ or $y \geq 5$		

