

# SEMESTER REVIEW (Day 2)

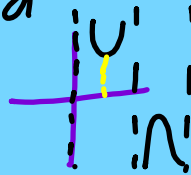
$$y = a \frac{\sin}{\cos} (bx+c) + d$$



amp

$\frac{\sin}{\cos}$   
 $|a|$

sec  
csc  
NA



tan  
cot  
NA



per.

$\frac{2\pi}{b}$

$\frac{2\pi}{b}$

$\frac{\pi}{b}$

v. s.

$d$

$d$

$d$

Sin x starts on axis + moves up  
Cos x starts at peak

(horiz)

p.s.

$$bx+c=0$$

$$x = -c/b$$

$$bx+c=0$$

$$bx+c=0$$

$$y = -\frac{1}{4} \sec(7x-3\pi) - 5$$

amp

NA ( $\frac{1}{4}$ )

per.

$\frac{2\pi}{7}$

v. s.

$-5$

p.s.

$$7x-3\pi=0$$

$$x = \frac{3\pi}{7}$$

$$x = \frac{3\pi}{7}$$

$$y = 2 - \tan(x+\pi)$$

amp

NA (-1)

graph falls

period

$\frac{\pi}{1} = \pi$

v. s.

$2$

p.s.

$$x+\pi=0$$

$$x = -\pi$$

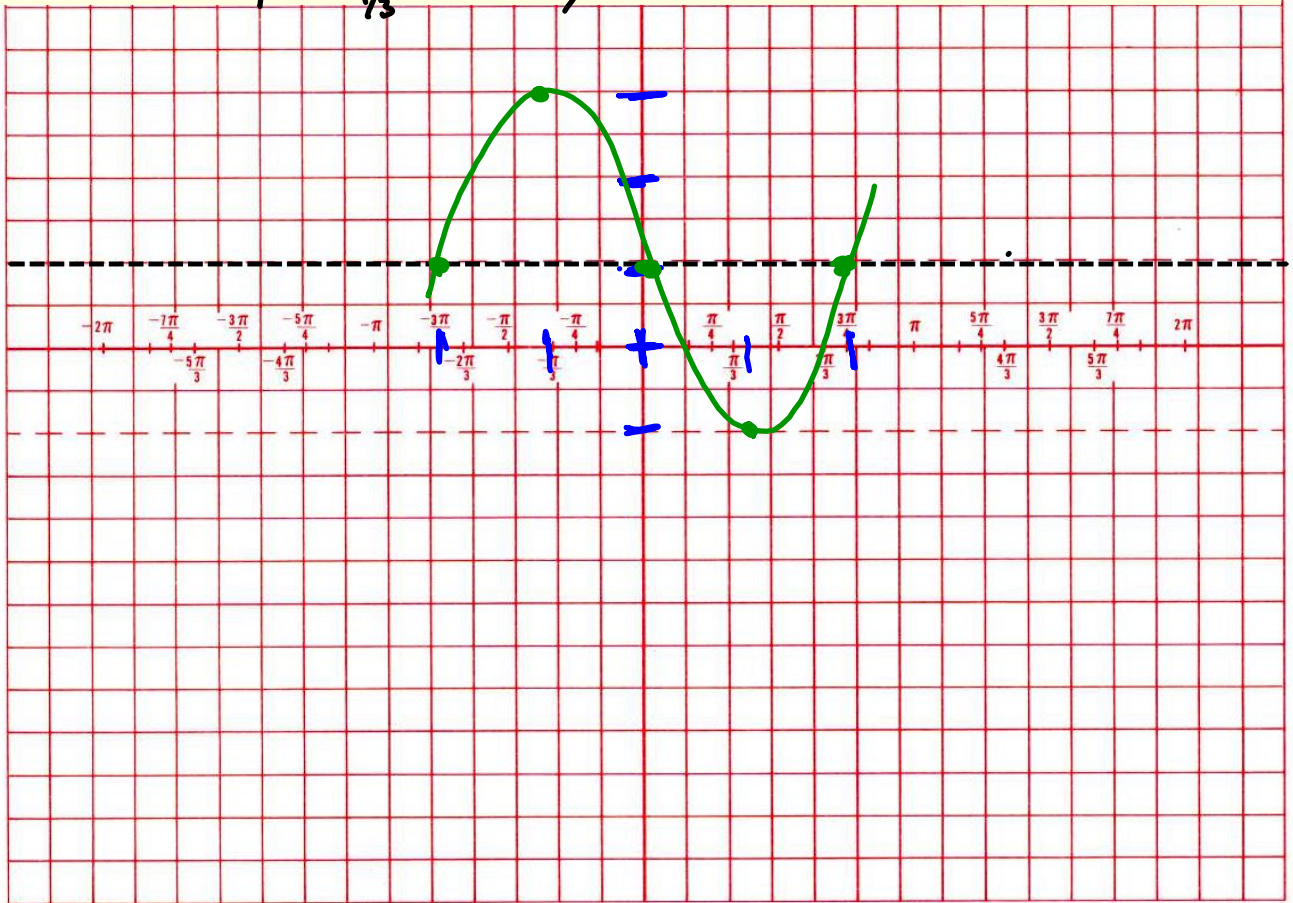
$$y = 2 \sin\left(\frac{1}{3}x + \pi\right) + 1$$

v.s 1  
amp 2

p.s.  $\frac{1}{3}x = -\pi$   
 $x = -\frac{3\pi}{1}$   
 per  $\frac{2\pi}{\frac{1}{3}} = 3\pi/2$

Spacing  
 per  $\times \frac{1}{4}$   
 $\frac{3\pi}{2} \cdot \frac{1}{4} = \frac{3\pi}{8}$

$-\frac{3\pi}{4}$	$-\frac{3\pi}{8}$	0	$\frac{3\pi}{8}$	$\frac{3\pi}{4}$
p.s.				
$-\frac{6\pi}{8}$	$-\frac{3\pi}{8}$	0	$\frac{3\pi}{8}$	$\frac{6\pi}{8}$



$$y = 2 \sin\left(\frac{1}{3}x + \pi\right) + 1$$

v.s 1  
amp 2

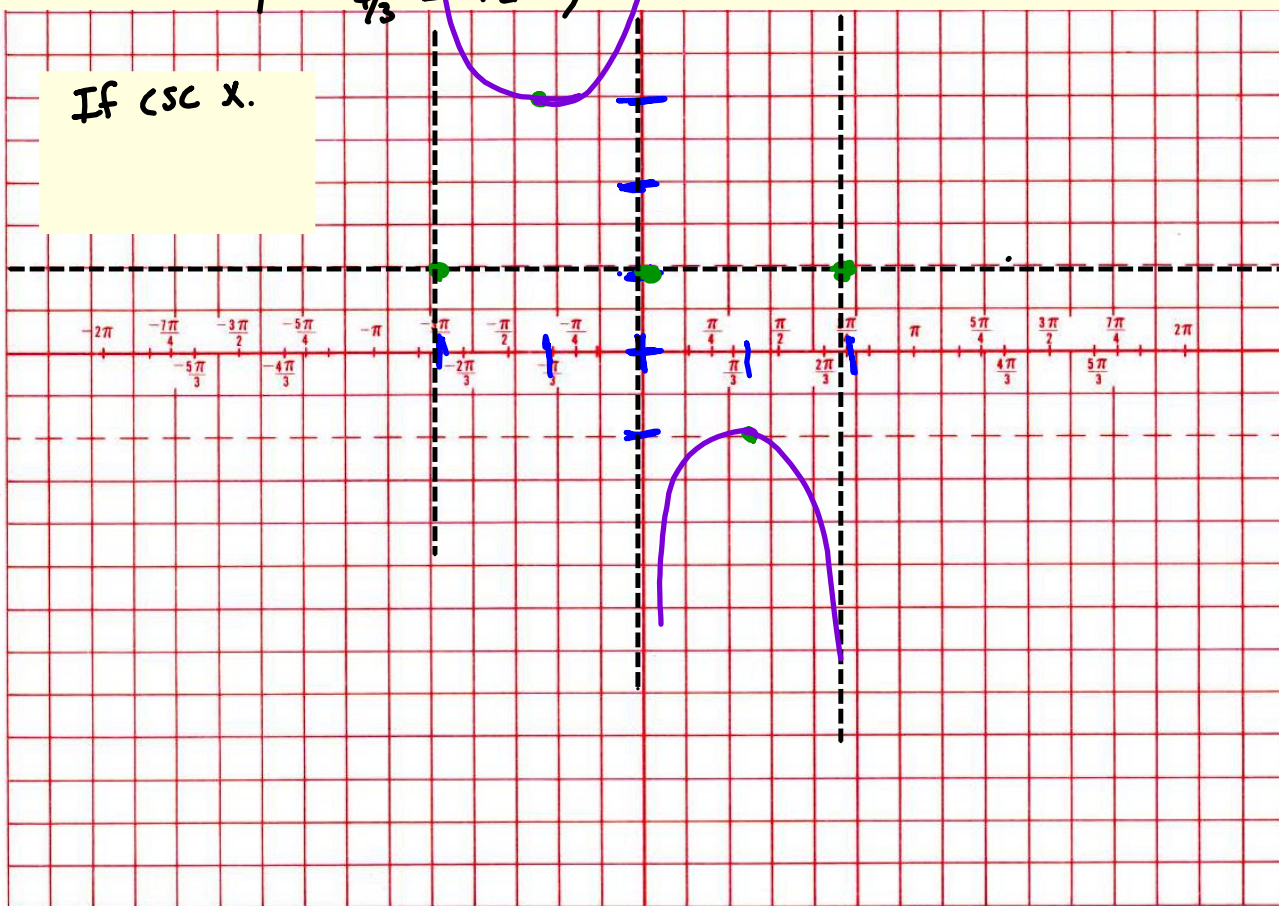
p.s.  $\frac{1}{3}x = -\pi$   
 $x = -\frac{3\pi}{1}$   
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Spacing

per  $\times \frac{1}{4}$   
 $\frac{3\pi}{2} \cdot \frac{1}{4} = \frac{3\pi}{8}$

$-\frac{3\pi}{4}$	$-\frac{3\pi}{8}$	0	$\frac{3\pi}{8}$	$\frac{3\pi}{4}$
p.s.				
$-\frac{6\pi}{8}$	$-\frac{3\pi}{8}$	0	$\frac{3\pi}{8}$	$\frac{6\pi}{8}$

If CSC x.



$$y = 3 \tan\left(\frac{1}{2}x + \frac{\pi}{6}\right)$$

amp NA(3)

per.  $\frac{\pi}{1/2} = 2\pi$

V.S. 0

P.S.  $\frac{1}{2}x + \frac{\pi}{6}$

$2 \cdot \frac{1}{2}x = -\frac{\pi}{6} \cdot 2$

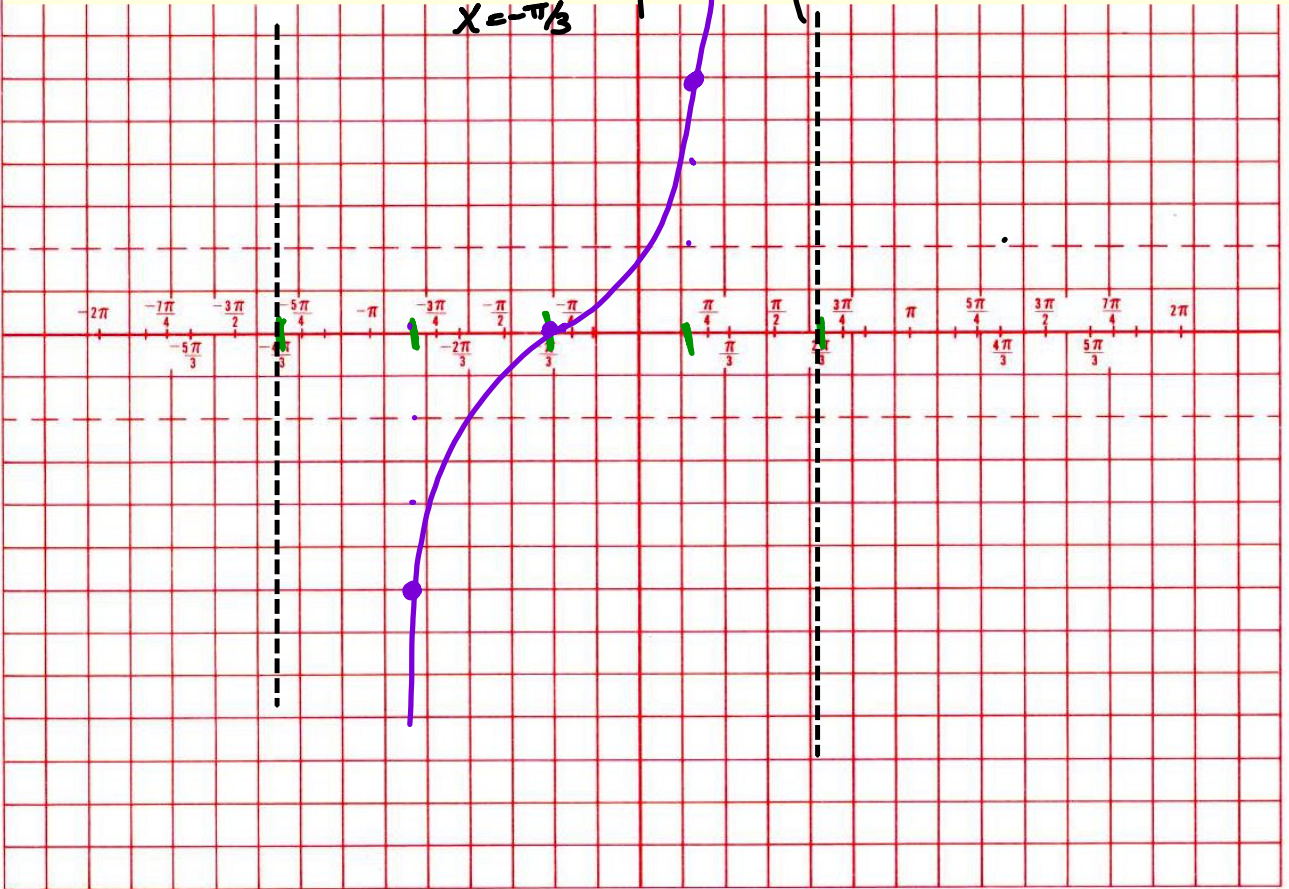
$x = -\pi/3$

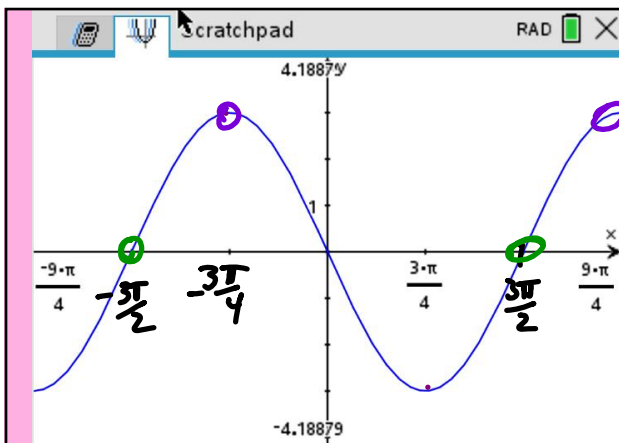
spacing:

$$2\pi \cdot \frac{1}{4} = \frac{\pi}{2}$$

$$\frac{\pi}{2} = \frac{3\pi}{6}$$

$-\frac{4\pi}{3}$	$-\frac{5\pi}{6}$	$-\frac{\pi}{3}$	$\frac{\pi}{6}$	$\frac{2\pi}{3}$
		P.S.		
$-\frac{8\pi}{6}$	$-\frac{5\pi}{6}$	$-\frac{2\pi}{6}$	$\frac{\pi}{6}$	$\frac{4\pi}{6}$





cos

$$y = 3 \cos \frac{2}{3} \left( x + \frac{3\pi}{4} \right)$$

$$\text{per} = \frac{2\pi}{b} \quad b = \frac{2\pi}{\text{per}} = \frac{2\pi}{3\pi}$$


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$$\text{tan/cot} \quad b = \frac{\pi}{\text{per.}}$$

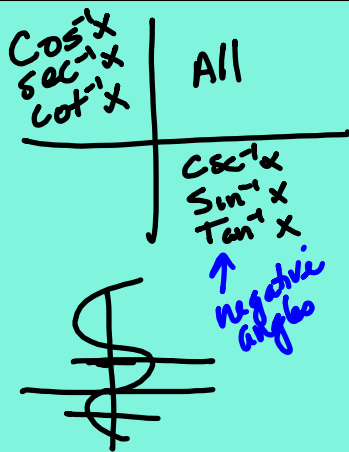
amp    per    p.s.    v.s.  
 3      3π    -3π/4    0  
 period = horiz. length of one cycle

Per: R - L

$$\frac{3\pi}{2} + 1 \frac{3\pi}{2} = \frac{6\pi}{2} = 3\pi$$

$$\frac{9\pi}{4} + \frac{3\pi}{4} = \frac{12\pi}{4} = 3\pi$$





$$\tan^{-1}\left(-\frac{\sqrt{3}}{3}\right) = -\frac{\pi}{6}$$

$$\text{Arcsec}(-\sqrt{2}) = \text{Sec}^{-1}(-\sqrt{2}) = \frac{3\pi}{4}$$

$$\cot\left(\cos^{-1}\left(-\frac{3}{5}\right)\right) = \frac{y}{x} = -\frac{4}{3}$$

Like 19(c)  $\sin(2 \text{Arcsec } 3)$

Double angle!  $\sin(2\theta) = 2 \sin\theta \cos\theta$

$$= 2 \left(\frac{2\sqrt{2}}{3}\right) \left(\frac{1}{3}\right) = \frac{4\sqrt{2}}{9}$$

$1 + y^2 = 9$   
 $y^2 = 8$   
 $y = 2\sqrt{2}$

19(f)  $\sin[A - B]$

Like 20a ~~19b~~

$$\text{Sec}^{-1} x - \sin^{-1} \frac{\sqrt{3}}{2} = \pi$$

Omit 20b.

1) Isolate trig func w/x

$$\begin{aligned} \text{Sec}^{-1} x - \frac{\pi}{3} &= \pi \\ \text{Sec}^{-1} x &= \frac{4\pi}{3} \\ \sec \frac{4\pi}{3} &= x \end{aligned}$$

↑ 3rd quad

← Switch variables using inverse.

No sol.

21(a)  $\tan \frac{x}{2} + 2 \sin 2x = \csc x$

$$\sin x \left[ \frac{1 - \cos x}{\sin x} + 2(2 \sin x \cos x) \right] = \frac{\sin x}{\sin x}$$

$[0, 2\pi)$   
Get rid of fractions by common denom.

$$1 - \cos x + 4 \sin^2 x \cos x = 1$$

$$4 \sin^2 x \cos x - \cos x = 0$$

$$\cos x (4 \sin^2 x - 1) = 0$$

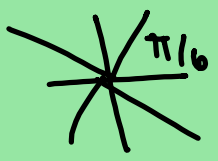
$$\cos x = 0 \quad 4 \sin^2 x - 1 = 0$$



$$\sqrt{\sin^2 x} = \sqrt{\frac{1}{4}}$$

$$\sin x = \pm \frac{1}{2}$$

$x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$   
 $\frac{\pi}{2}, \frac{3\pi}{2}$



Check if

- 1) had fractions
- 2) squared both sides

21(b)  $\sin x = 0.3678$  ← Fake #'s  
Calculator  $\sin^{-1}(0.3678)$

Polar Coordinates

$(r, \theta)$

Complex #<sup>'s</sup>  $r(\cos \theta + i \sin \theta)$

$(3, 257^\circ)$

$x = r \cos \theta = 3 \cos 257^\circ =$

$y = r \sin \theta = 3 \sin 257^\circ =$

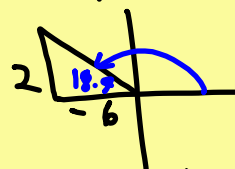
Rectangular

$(x, y)$

$x + yi$

$(-6, 2)$   
Find polar.

Draw pic!



$r = \sqrt{x^2 + y^2}$

$4 + 36 = r^2$   
 $\sqrt{40} = \sqrt{r^2}$   
 $2\sqrt{10} = r$

$\tan \theta = \frac{2}{-6}$   
 $= -0.33$   
 $\theta = 161.6^\circ$

$(2\sqrt{10}, 161.6^\circ)$



$$x^5 - (2 - 2i) = 0$$

$$(x^5)^{1/5} = (2 - 2i)^{1/5}$$

$$x = (2 - 2i)^{1/5}$$



$$\tan \theta = \frac{-2}{2} = -1$$

$$\theta = 315^\circ$$

$$\left[ \sqrt{8} (\cos 315^\circ + i \sin 315^\circ) \right]^{1/5}$$

$$8^{1/10} (\text{cis } 63^\circ)$$

$$8^{1/10} (\text{cis } 135^\circ)$$

$$8^{1/10} (\text{cis } 207^\circ)$$

$$8^{1/10} (\text{cis } 279^\circ)$$

$$8^{1/10} (\text{cis } 351^\circ)$$

$$\left[ 3 (\cos 120^\circ + i \sin 120^\circ) \right]^3$$

$$3^3 (\cos (3 \cdot 120^\circ))$$

$$27 (\cos 360^\circ + i \sin 360^\circ)$$

$$27 (1 + 0i)$$

$$= 27$$

$$360 \cdot \frac{1}{3} = 120^\circ$$