[112 REVIEW KEY] - (EXAM 1)

[1.] a) $472°$ & $-248°$ ARE COTERMINAL w/ $112°$

b) $450°$ & $-270°$

c) $-\frac{2\pi}{3}$ & $\frac{10\pi}{3}$

[2.]

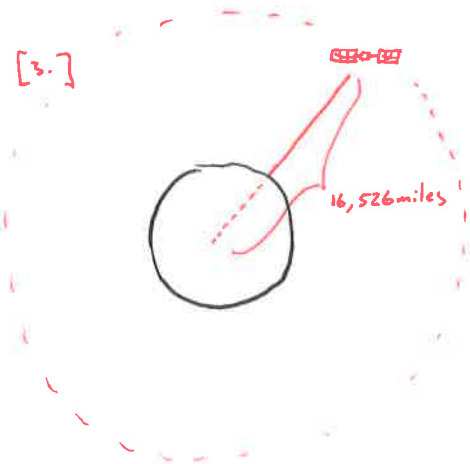
$$\begin{array}{r} 41° \ 29' \ 57'' \\ -\ 25° \ 46' \ 26'' \\ \hline 15° \ 43' \ 31'' \end{array}$$

$\longrightarrow \sim 15.7253° \left(\frac{\pi}{180}\right)$

$s = r\theta = (3{,}963)(.27446 \text{ rad.}) = \boxed{1087.68 \text{ miles}}$

$r = 3{,}963$

[3.]



ANGULAR SPEED $= \omega = \frac{\theta}{t} = \frac{2\pi}{12} = \boxed{\frac{\pi}{6} \text{ rad / HOUR}}$

LINEAR SPEED $= r(\omega) = 16{,}526\left(\frac{\pi}{6}\right)$

$= \boxed{8{,}652.99 \text{ mph}}$

[4.] $150° = \frac{5\pi}{6}$ radians

SECTOR AREA $= A = \frac{1}{2}r^2\theta = \frac{1}{2}(7^2)\left(\frac{5\pi}{6}\right) = \boxed{\frac{245\pi}{12} \text{ in}^2}$

[5.] USING $30°-60°-90°$ & $45°-45°-90°$ $\triangle$'s ..

$a = 6$

$b = 6\sqrt{3}$

$c = 6\sqrt{3}$

$d = 6\sqrt{6}$

$e = \frac{25\sqrt{2}}{2}$

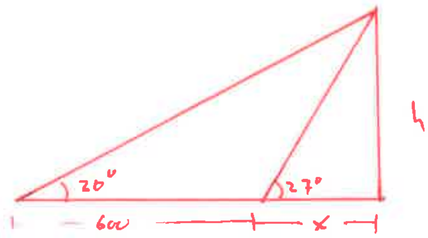
$f = \frac{25\sqrt{2}}{2}$

$h = \frac{25\sqrt{3}}{3}$

$g = \frac{50\sqrt{3}}{3}$

[9]

$$\begin{cases} \tan(20) = \dfrac{h}{600 + x} \\ \tan(27) = \dfrac{h}{x} \end{cases}$$



(NOT TO SCALE)

$$\hookrightarrow \begin{cases} 600\tan(20) + x\tan(20) = h \\ x\tan(27) = h \end{cases}$$

$$\hookrightarrow \quad 600\tan(20) + x\tan(20) = x\tan(27)$$

$$600\tan(20) = x\tan(27) - x\tan(20)$$

$$600\tan(20) = x\left(\tan(27) - \tan(20)\right)$$

$$\frac{600\tan(20)}{\tan(27) - \tan(20)} = x = 1500.34 \text{ FT}$$

$$\therefore\ h = (1500.34)\tan(27) = 764.46 \text{ FT.}$$

[10]

$\text{dom}(\arctan x) := \mathbb{R}$ (ALL REALS)

[11.]

SOLVING FOR a

$17^2 = a^2 + 14^2$

$\sqrt{17^2 - 14^2} = a \approx 9.64$

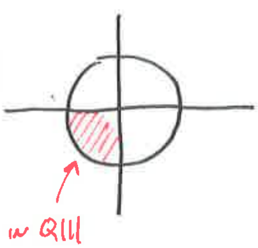
SOLVING FOR α & β

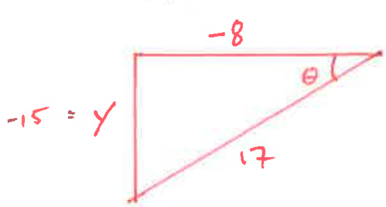
$\cos(\alpha) = \dfrac{14}{17}$

$\alpha = \cos^{-1}(14/17) = 34.56°$

$\therefore\ \beta = 90 - 34.56 = 55.44$

[12.]





$y^2 = 17^2 + (-8)^2 = 255$

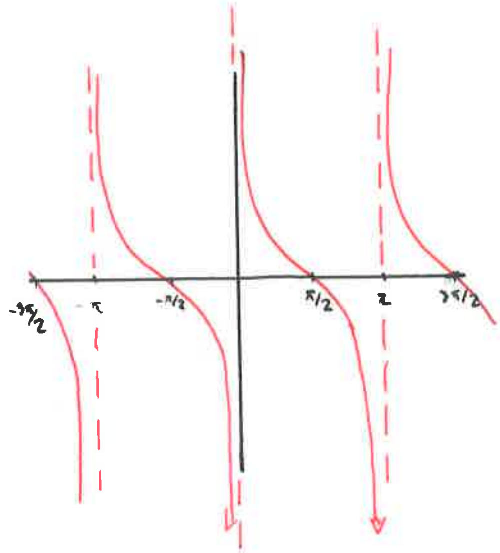
$\therefore\ y = -15$

$\sin\theta = \dfrac{-15}{17}$ $\quad\csc\theta = -17/15$

$\tan\theta = \dfrac{15}{8}$ $\quad\cot\theta = 8/15$

$\sec\theta = -17/8$

[13.]



[14.] a. amplitude: 2

PERIOD: π

P-SHIFT: LEFT $\pi/2$

V-SHIFT: 0

b. amplitude: $1/2$

period: 4

P-SHIFT: RIGHT 1

V-SHIFT: DOWN 2

[15.] a. ~~$\sin\theta = 5\left(\frac{15}{13}\right)$~~

$\sin\theta = \frac{15}{39}$

$\boxed{\theta = 22.62^\circ}$

b. $\sin\theta = \sqrt{0.67}$

$\boxed{\theta = 68.87^\circ}$

c. $\sec\theta = 15/2$

$\theta = \sec^{-1}(15/2) = \cos^{-1}(2/15)$

$\boxed{\theta = 82.34^\circ}$

d. $\csc\theta = 24.12$

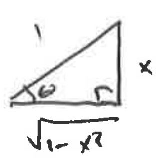
$\theta = \csc^{-1}(24.12) = \sin^{-1}\left(\frac{1}{24.12}\right)$

$\boxed{\theta = 2.37^\circ}$

[~~16.~~] 17.

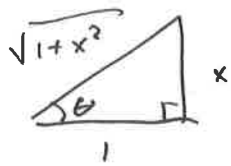
LET $\theta = \sin^{-1} x$

$\therefore \sin\theta = x$



so $\boxed{\sec\theta = \frac{1}{\sqrt{1-x^2}}}$

[16.] If $\theta = \sin^{-1}\left(\frac{x}{\sqrt{1+x^2}}\right)$, then $\sin\theta = \frac{x}{\sqrt{1+x^2}}$



$\therefore \boxed{\cos\theta = \frac{1}{\sqrt{1+x^2}}}$

[18.] a. $s(t) = -5\cos(2\pi F t) = \boxed{-5\cos(2.5\pi t)}$

$F = \frac{1}{P} = \frac{1}{0.8}$

b. $s(1) = -5\cos(2.5\pi) = -5(0) = \boxed{0}$

[19.] Gotta know that ~~F = 2πF~~

$$b = 2\pi F$$

so $s(t) = 0.27\cos(2\pi(25.5)t) = \boxed{0.27\cos(51\pi t)}$

[20.] a. $f(t) = -2\sin\left(\frac{1}{2}(t-\pi)\right) + 1$

t	$\sin t$
0	0
$\pi/2$	1
π	0
$3\pi/2$	-1
2π	0

$\xrightarrow[+\pi]{\text{P-SHIFT}}$

t	$\sin(t-\pi)$
π	0
$3\pi/2$	1
2π	0
$5\pi/2$	-1
3π	0

$\xrightarrow[\times -2]{\text{AMPLITUDE}}$

t	$-2\sin(t-\pi)$
π	0
$3\pi/2$	-2
2π	0
$5\pi/2$	2
3π	0

$\xrightarrow{\text{WAVELENGTH}}$

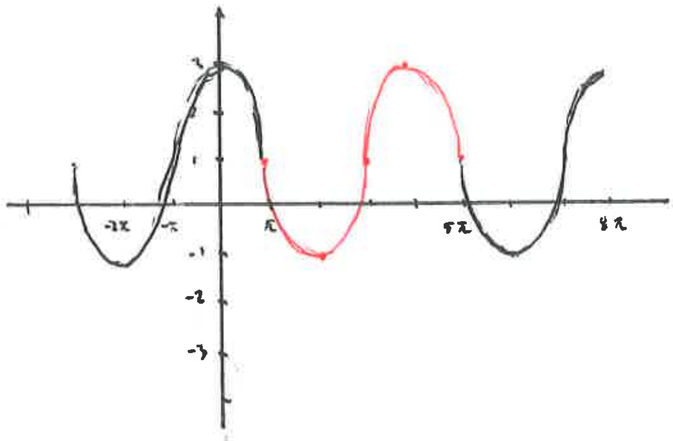
New period: $2\pi/\frac{1}{2} = 4\pi$

t	$-2\sin\left(\frac{1}{2}(t-\pi)\right)$
π	0
2π	-2
3π	0
4π	2
5π	0

$\xrightarrow[+1]{\text{V-SHIFT}}$

t	$-2\sin\left(\frac{1}{2}(t-\pi)\right)+1$
π	1
2π	-1
3π	1
4π	3
5π	1

Graph on next page →



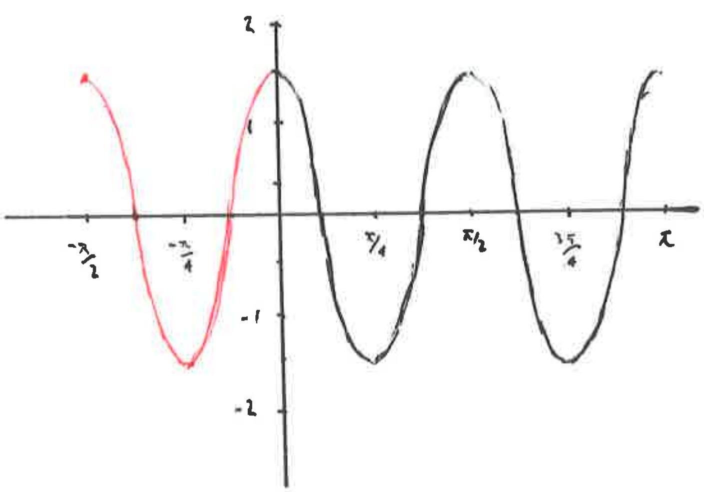
b. $g(t) = 1.5\cos(4(t + \pi/2))$

t	cos
0	1
$\pi/2$	0
π	-1
$3\pi/2$	0
2π	1

$\xrightarrow{\text{I DID STUFF}}$

NEW PERIOD IS $\frac{2\pi}{4} = \pi/2$

t	$1.5\cos(4(t+\pi/2))$
$-\pi/2$	1.5
$-3\pi/8$	0
$-\pi/4$	-1.5
$-\pi/8$	0
0	1.5



c. $k(t) = 9\sin(\pi t)$

t	$\sin t$
0	0
$\pi/2$	1
π	0
$3\pi/2$	-1
2π	0

MORE STUFF HAPPENED

AMPLITUDE: 9 | PERIOD: 2 →

t	$9\sin(\pi t)$
0	0
0.5	9
1	0
1.5	-9
2	0