Precal Name: KEY

Review Chapter 4 (Unit 5)

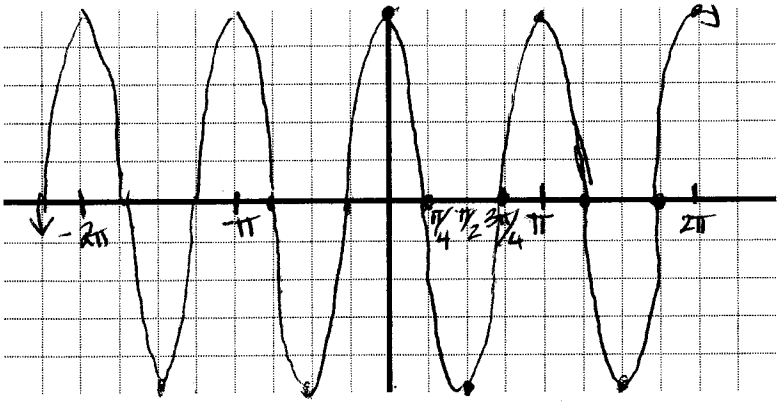
(Graphs & Equations of Trigonometric Functions)

1) Graph at least two periods and show critical points: $y = -5\cos(2x - \pi)$

$y = -5\cos\left(2(x - \pi/2)\right)$

Amp: 5 pd: π

V.S.: none P.S.: right $\pi/2$

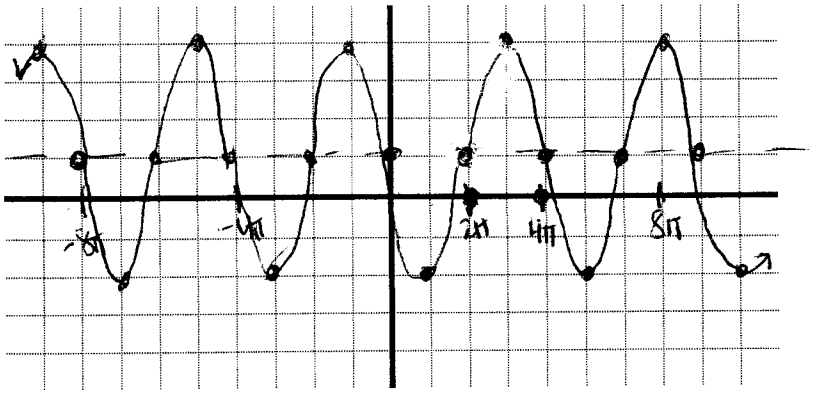


2) Graph at least two periods and show critical points: $y = 3\sin(0.5x - \pi) + 1$

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

Amp: 3 pd: 4π

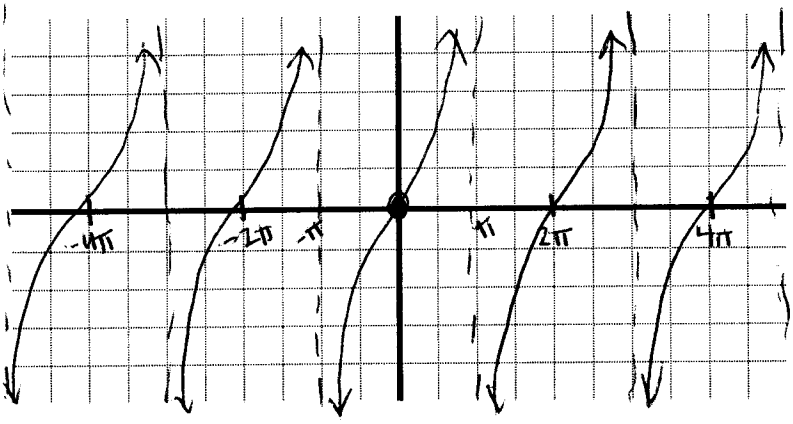
V.S.: up 1 P.S.: right 2π



3) Graph at least two periods, show critical points: $y = 3\tan(\frac{1}{2}x)$

pd: 2π

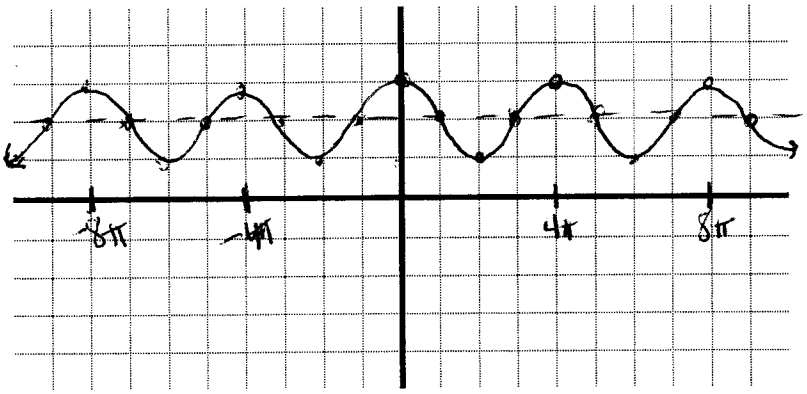
V.S.: none H.S.: horizontal stretch $*2$



4) Graph at least two periods, show critical point: $y = \cos(\frac{1}{2}x) + 2$

Amp: 1 pd: 4π

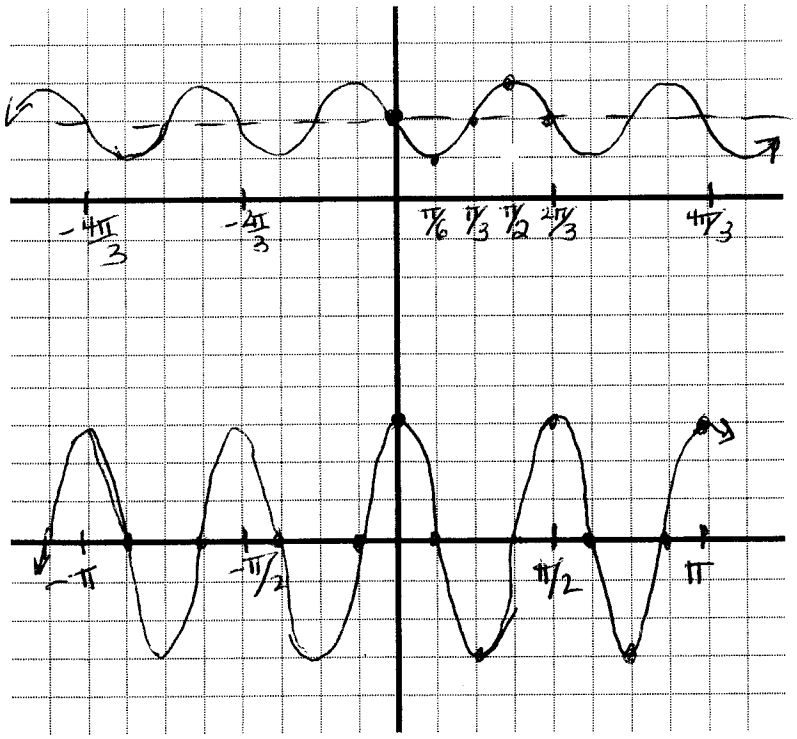
V.S.: up 2 P.S.: none



5) Graph at least two periods and show critical points: $y = -\sin(3x) + 2$

Amp: 1 pd: $\frac{2\pi}{3}$

V.S.: 2 P.S.: none



6) Graph at least two periods and show critical points: $y = 3\cos(4x)$

Amp: 3 pd: $\frac{\pi}{2}$

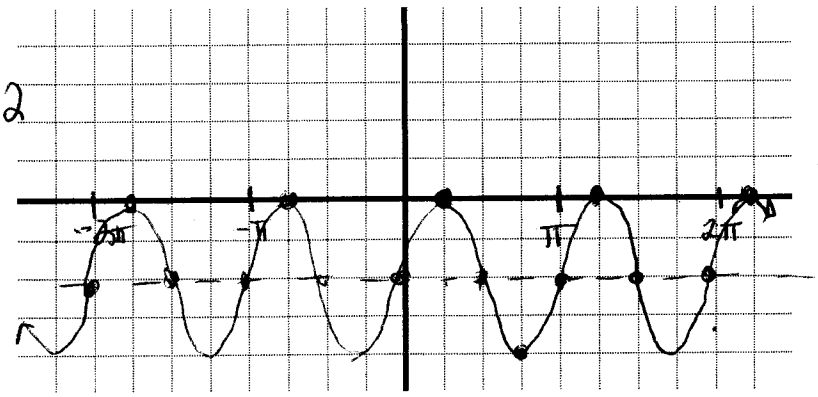
V.S.: none P.S.: none

7) Graph at least two periods and show critical points: $y = -2\sin(2x + \pi) - 2$

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

Amp: 2 pd: π

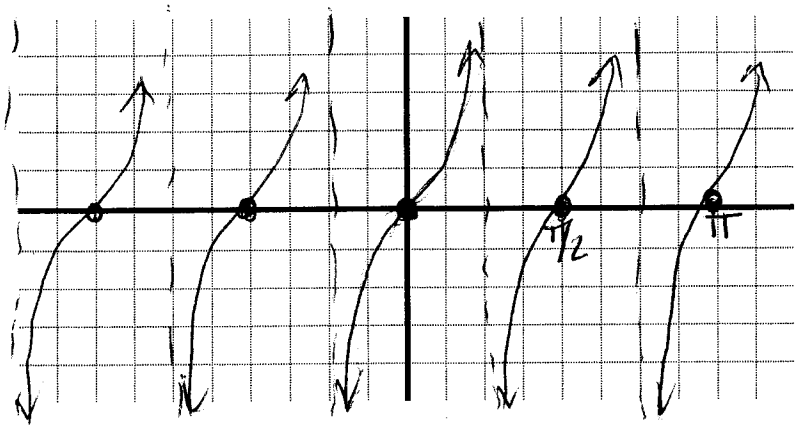
V.S.: down 2 P.S.: left $\pi/2$



8) Graph at least two periods, & show asymptotes: $y = 3\tan[2(x - \pi)]$

pd: $\frac{\pi}{2}$

V.S.: none H.S.: horizontal shrink $* \frac{1}{2}$



tan x

x	tan x
0	0
$\pi/4$	1
$\pi/2$	undef.

9) Describe the transformations of a basic trigonometric function which would result in the function below:

a) $y = -3\cos(x + 3) - 5$

shift left 3
vertical stretch * 3
reflect over x-axis
shift down 5

b) $y = 0.7\sin(3x - 4) + 1 = 0.7\sin\left(3\left(x - \frac{4}{3}\right)\right) + 1$

Shift right $\frac{4}{3}$
horiz. shrink * $\frac{1}{3}$
vert. shrink * 0.7
Shift up 1

10) Construct a sinusoidal function using the information given: (this means give an equation)

a) A cosine curve with reflected over x-axis, vertically stretched by a factor of 3, horizontally stretched by a factor of 2 and shifted left 4 units.

$$y = -3\cos\left[\tfrac{1}{2}(x-4)\right]$$

b) A sine curve reflected over the y-axis, vertically shrunk by a factor of 1/3, horizontally ~~shrunk~~ stretched by a factor of 3, and shifted up 7 units.

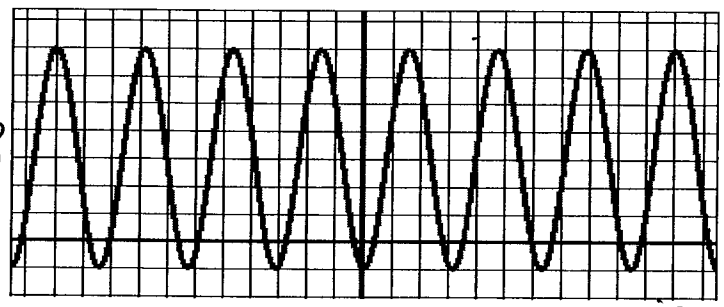
$$y = \tfrac{1}{3}\sin\left(\tfrac{1}{3}(-x)\right) + 7$$

c) Maximum located at (3, 1) & minimum located at (4, -7).

$$y = 4\sin\left(\pi(x - .5)\right) - 3$$

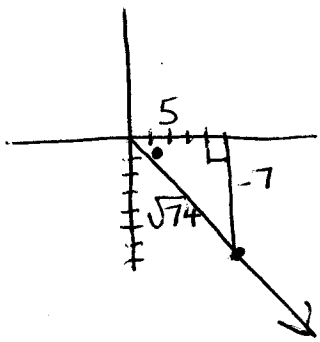
d) This is a cosine function graphed in a window $[-4\pi, 4\pi]$ by [-2, 8.3]

$$y = -4\cos(2x) + 3$$



11) Find $\sec\theta$ given that the terminal side of θ passes through the point (5, -7)

$\sec\theta = \frac{\sqrt{74}}{5}$

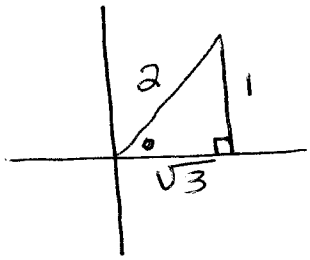


$m^2 = 5^2 + (-7)^2$
$m = \sqrt{74}$

12) Given that $\csc\theta = \frac{2}{1}$ and $\cos\theta > 0$ find θ and $\cos\theta$.

pos quad 1 & 2
pos quad 1 & 4

$\theta = \frac{\pi}{6}$ $\cos\theta = \frac{\sqrt{3}}{2}$



$2^2 = 1^2 + m^2$
$3 = m^2$
$m = \sqrt{3}$

13) Give the exact value for each expression:

a) tan (330°) $\frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$

b) cos(7π/3) $\frac{1}{2}$

c) sin(–7π/6) $\frac{1}{2}$

d) sec(–135°) $-\frac{2}{\sqrt{2}} = -\sqrt{2}$

e) cot (7π/4) $\frac{\frac{\sqrt{2}}{2}}{-\frac{\sqrt{2}}{2}} = -1$

f) sin (270°) -1

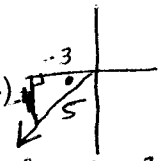
g) cos(2π) 1

h) tan(π/2) $\frac{1}{0}$ undefined

i) csc(–3π/2) 1

j) cot (5π/2) $\frac{0}{1} = 0$

14) Find cosθ & sinθ given that the side of θ passes through the point (-3, -4).



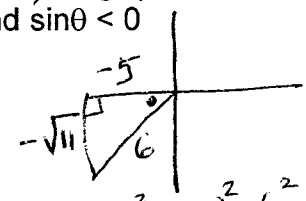
cosθ = $\frac{-3}{5}$ & sinθ = $\frac{-4}{5}$

$(-3)^2+(-4)^2=m^2$

$m=5$

15) Given that secθ = -6/5 and sinθ < 0 find tan θ and cos θ.

neg 2nd & 3rd neg 3rd & 4th



tan θ = $\frac{\sqrt{11}}{5}$ cos θ = $\frac{-5}{6}$

$m^2+(-5)^2=6^2$

$m=-\sqrt{11}$

16) $\cos^{-1}(\cos(3\pi/4))$ = $\frac{3\pi}{4}$

$\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$

17) $\sin^{-1}(\tan(\pi/4))$ = $\frac{\pi}{2}$

$\sin^{-1}(1)$

18) Find a positive and a negative angle co-terminal with 70°. (+) 430° & (–) 290°

$\pm 360°$

19) Find the length of an arc with central angle of 45° and a radius of 7in. $45° \cdot \frac{\pi}{180} = \frac{\pi}{4}$

$s = r\theta$

$s = 7\left(\frac{\pi}{4}\right) = \boxed{\frac{7\pi}{4} \text{ inches}}$

20) Find the radius of a circle with a central angle of 6π/7 intercepting an arc of length π cm.

$s = r\theta$

$\pi = r\left(\frac{6\pi}{7}\right)$

$r = \frac{\pi}{\frac{6\pi}{7}} = \pi \cdot \frac{7}{6\pi} = \boxed{\frac{7}{6} \text{ cm}}$

18) Find a positive and a negative angle co-terminal with 70°. (+)____ & (−)____

19) Find the length of an arc with central angle of 45° and a radius of 7in.

20) Find the radius of a circle with a central angle of $6\pi/7$ intercepting an arc of length π cm.

21) Mr. Smith is taking the backpacking club on a hike. From where he is standing the angle of elevation to the top of the mountain is 65°. Another student is standing 25ft away, and from where she is standing the angle of elevation is 50°. How tall is the mountain? 67.06 ft

Review Part 2:

Evaluate the following trigonometric functions.

1. $\sin(\frac{\pi}{6})$ $\frac{1}{2}$
2. $\cos(\frac{\pi}{4})$ $\frac{\sqrt{2}}{2}$
3. $\tan(\frac{\pi}{3})$ $\sqrt{3}$
4. $\cos(\frac{2\pi}{3})$ $-\frac{1}{2}$
5. $\cot(\frac{5\pi}{6})$ $-\sqrt{3}$
6. $\csc(\frac{3\pi}{4})$ $\frac{2}{\sqrt{2}} = \sqrt{2}$
7. $\tan(-\frac{\pi}{6})$ $-\frac{1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$
8. $\sin(-\frac{5\pi}{6})$ $-\frac{1}{2}$
9. $\sec(-\frac{3\pi}{4})$ $-\frac{2}{\sqrt{2}} = -\sqrt{2}$
10. $\sin(\frac{\pi}{2})$ 1
11. $\cos(\frac{\pi}{2})$ 0
12. $\tan(\frac{\pi}{2})$ undefined

Find two values of θ in degrees ($0° \le \theta < 360°$) for the following angles.

13. $\sin\theta = \frac{\sqrt{2}}{2}$ 45°, 135°
14. $\cos\theta = \frac{1}{2}$ 60°, 300°
15. $\tan\theta = \sqrt{3}$ 60°, 240°
16. $\sin\theta = -\frac{1}{2}$ 210°, 330°
17. $\tan\theta = -1$ 135°, 315°
18. $\cos\theta = -\frac{\sqrt{3}}{2}$ 210°, 150°

19. Let θ be an angle in quadrant II such that $\sin\theta = \frac{1}{4}$. Find the following.

a. $\cos\theta$ $-\frac{\sqrt{15}}{4}$

b. $\tan\theta$ $-\frac{1}{\sqrt{15}} = -\frac{\sqrt{15}}{15}$

20. Let θ be an angle in quadrant II such that $\cos\theta = -\frac{2}{3}$. Find the following.

a. $\sin\theta$ $\frac{\sqrt{5}}{3}$ b. $\tan\theta$ $\frac{\sqrt{5}}{-2}$

21. Let θ be an angle in quadrant III such that $\tan\theta = \frac{3}{5}$. Find the following.

a. $\sin\theta$ $\frac{-3}{\sqrt{34}} = \frac{-3\sqrt{34}}{34}$ b. $\cos\theta$ $\frac{-5}{\sqrt{34}} = \frac{-5\sqrt{34}}{34}$

22. Let θ be an angle in quadrant IV such that $\sin\theta = -\frac{2}{7}$. Find the following.

a. $\cos\theta$ $\frac{3\sqrt{5}}{7}$ b. $\tan\theta$ $\frac{-2}{3\sqrt{5}} = \frac{-2\sqrt{5}}{15}$