Name:_____ Date:_____

Math 12 Honors ch4 Review Trigonometric Functions and Transformations 2023

1. By definition, what is an odd function? What is an even function? Given examples of even and odd functions:

2. Which of the following equations below are true. CIRCLE All that are true

$\sin\theta = \sin(-\theta)$ $\sin\theta = -\sin(-\theta)$ $\cos\theta = \cos(-\theta)$ $-\cos\theta = \cos(-\theta)$

$\tan\theta = -\tan(\theta)$ $\cot\theta = -\cot(-\theta)$ $\csc\theta = \csc(-\theta)$ $\sec\theta = -\sec(-\theta)$

3. For each of the following trigonometric functions find the following:

i) Period and amplitude
ii) Phase shift
iii) All "X" intercepts from $-3\pi \ to \ 3\pi$, also provide the general formula for all "x" intercepts
iv) Maximum and Minimum points

a) $y = \frac{2}{3}\sin\frac{\left(x-\frac{2\pi}{3}\right)}{4}+11$

b) $y = -\frac{3}{4}\cos\left(2x-\frac{7\pi}{3}\right)-\frac{2}{7}$

c) $y = 4.3\tan\frac{3x-8}{5}-2.1$

d) $y = 8.5\sin\frac{(8-2x)}{3}+1$

e) $y = -8.33\tan\frac{3\pi(4-x)}{2}+2$

f) $y = -\frac{8}{3}\cos\frac{4\pi(8-3x)}{5}+2.1$

4. Given that $y = 3\cos\frac{x-11}{4}+2$ is congruent to the function $y = 3\sin\frac{(x-A)}{4}+2$, what is the smallest positive value of "A"? Show all your work.

5. For each of the following trigonometric functions find the following:

i) Period

ii) Equation of all vertical asymptotes

iii) All "X" intercepts from $-3\pi \ to \ 3\pi$, also provide the general formula for all "x" intercepts

iv) Maximum and Minimum points

a) $y = -\frac{3}{2}\csc\left(x-\frac{3\pi}{4}\right)+5$

b) $y = -3.4\sec\pi\left(\frac{x-3}{4}\right)+4$

c) $y = -2.2\cot\frac{3\pi}{4}(2x-5)+1$

d) $y = 3.5\csc\frac{4\pi}{3}(3x-7)-4$

e) $y = -\frac{2}{3}\cot\frac{3\pi}{2}(4-7x)+3$

6. How many solutions are there in the interval from 0 to 2π? Explain:

i) $3\sin 3\left(\theta-\frac{7\pi}{3}\right)+2=0$ ii) $2\sin\frac{13}{2}\left(x-\frac{3\pi}{2}\right)+1=0$

7. For what values of "k" will there be no solutions? Explain:

i) $5\cos\frac{3\pi}{7}\left(\theta-\frac{\pi}{8}\right)+k=0$ ii) $\frac{k}{2}\cos\frac{4-\theta}{3}+k-4=0$

8. Given the information about each trigonometric function, find a sinusoidal equation that describes it:

a) Maximum point at (9,10) and the next minimum point at (13, -2)

b) Maximum point at $\left(\frac{2\pi}{3}, 11\right)$ and the next minimum point at $\left(\frac{9\pi}{2}, 3\right)$

c) Amplitude of 9, minimum point at $(5.25,\ 2)$ and period of 10.

9. High tide at 3am with water depth at 2.75m, low tide at 2:30pm with water depth at 1.75m.
   a) Write an equation that describes the water depth throughout the day

   b) What is the water depth at noon?

   c) In order to set sail, ocean depth must be at least 2.35meters deep. At what times throughout the day will you be able to set sail?

10. Suppose the distance between two planetary objects follow a sinusoidal function. In three years, the two planets will be at their closest at 4.5 AU (astronomical units - 1.496e+8 km). In 22 years, the two planets will be at their farthest at 10.5 AU. The cycle repeats itself.

a) Write an equation that describes the distances [AU]between the two planets as a function of the number of years

b) How far will the two planets be from each other in 10 years?

c) To travel between the two planets, the distances between them must be within 6AU. So in the next 100 years, what percentage of that time is it conducive to interplanetary travel between the two planets?