MATH 30 - Precalculus. Homework 9. Due We. 04/17/2024. Professor Luis Fernández

NAME:_____

DO NOT write your answers here. Do it in other sheets and **show all your work**.
STAPLE this sheet to your other sheets.

1. For the following sinusoidal functions, find the amplitude, the period, and the phase shift. You do not have to graph the functions.

a) $f(x) = 3\sin\left(2x - \frac{2\pi}{3}\right)$

b) $f(x) = -5\sin\left(5x - \frac{\pi}{3}\right)$

c) $f(x) = \frac{2}{3}\cos\left(\pi x - \frac{\pi}{2}\right)$

d) $f(x) = 4\sin\left(3x + \frac{3\pi}{4}\right)$

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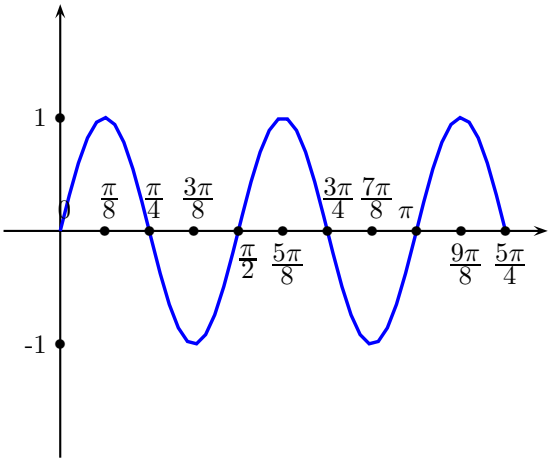
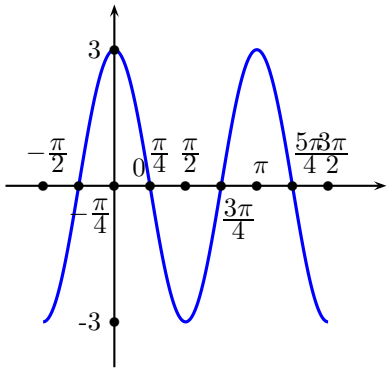
2. The following are the graphs of functions of the form $f(x) = A\sin(Bx - C)$, with $A > 0$. Find the amplitude, the period, and the phase shift. Then use this information to find the values of A, B and C (recall that A will be equal to the amplitude, that the period is $2\pi/B$, and that the phase shift equals B/C).

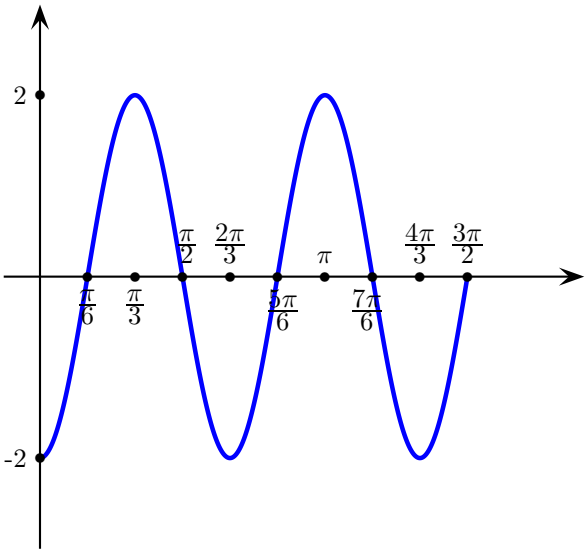
a)



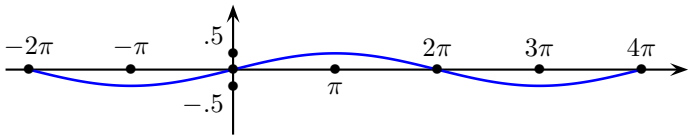
b)



c)



d)



3. Use the fundamental identities of trigonometric functions to write the following expressions using only sine and cosine and simplify them as much as possible.

a) $\sin x \cos x \sec x$

b) $\tan x \sin x + \sec x \cos^2 x$

c) $\csc x - \cos x \cot x$

d) $3 \sin^3 x \csc x + 3 \cos^2 x$

e) $\dfrac{1 - \cos^2 x}{\tan^2 x} + \sin^2 x$

f) $\dfrac{1 + \tan^2 x}{\csc^2 x} + \sin^2 x + \dfrac{1}{\sec^2 x}$

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4. Prove the following trigonometric identities.

a) $\cos x \, (\tan x - \sec x) = \sin x - 1$

b) $\cos x - \cos^3 x = \cos x \sin^2 x$

c) $\sec^2 x(1 + \cos^2 x) = \tan^2 x$

d) $\sin x \, (\cot x + \csc x) = \cos x + 1$

e) $\cos^2 x(1 + \tan^2 x) = 1$

f) $\sin x \, \tan x = \sec x - \cos x.$

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5. Solve the following equations, for x in the interval $0 \leq x < 2\pi$.

a) $2 \sin x = -\sqrt{2}$

b) $4 \sin^2 x - 2 = 0$

c) $2 \sin x = -\sqrt{3}$

d) $2 \cos x - \sqrt{3} = 0$

e) $3 \cos x + \sqrt{3} = \cos x$

f) $3 \sin x - \sqrt{3} = \sin x$