
Read Me First: *Show all essential work neatly. Use correct notation when presenting your computations. Write using complete sentences. In particular, be very careful when using "=",* ***equals****, and "⇒",* ***implies****. Do not "box" your answers. Communicate.*

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1. (6 pts.) Find the amplitude, period, and phase shift of the following function: $y = -2 \cdot \sin(2\pi x + (\pi/2))$

Amplitude =

Period =

Phase Shift =

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2. (6 pts.) Write the equation of a sine function that has all the given characteristics:

Amplitude = 2π Period = 1/3 Phase Shift: -(1/6)

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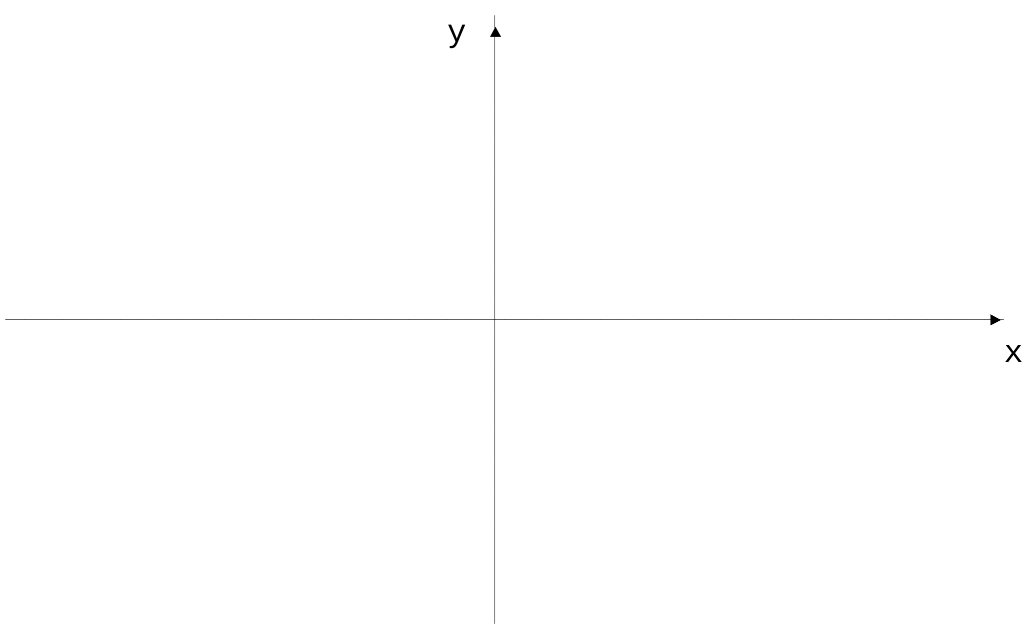
3. (10 pts.) Carefully sketch $y = 3\sin(2x - \pi)$ through one period. You will need the amplitude, period, and phase shift to do this properly. Label very carefully.



4. (18 pts.) Fill in the following table with the information requested concerning domain, range, and period.

Function Name	Domain (in radians)	Range	Period (in radians)
$\sin(\theta)$			
$\cos(\theta)$			
$\tan(\theta)$			
$\cot(\theta)$			
$\sec(\theta)$			
$\csc(\theta)$			

5. (5 pts.) Establish the following identity. Show all steps very, very carefully.

$$\frac{1 - \sin(\alpha)}{\cos(\alpha)} = \frac{\cos(\alpha)}{1 + \sin(\alpha)}$$

6. (5 pts.) Obtain the exact value of $\cos(\pi/8)$. **Show clearly and neatly all the uses of appropriate identities.**

$\cos(\pi/8) =$

7. (5 pts.) If $\csc(\theta) = 4$ and $\cos(\theta) < 0$, what is the exact value of $\sin(2\theta)$?? **Show clearly and neatly all your uses of appropriate identities.**

$\sin(2\theta) =$

8. (5 pts.) Express the following product as a sum containing only sines or cosines.

$\sin(5\theta)\cos(3\theta) =$

9. (10 pts.) Find the exact value of each of the following expressions if $\tan(\alpha) = -5/12$ with $\pi/2 < \alpha < \pi$ and $\sin(\beta) = -1/2$ with $\pi < \beta < 3\pi/2$. **Show all your uses of appropriate identities.**

$\sin(\alpha - \beta) =$

$\cos(\alpha + \beta) =$

10. (20 pts.) Time to pay the piper.... Give the exact values for the following:

(a) $\sin(0) =$

(b) $\sin(\pi/6) =$

(c) $\sin(\pi/4) =$

(d) $\sin(\pi/3) =$

(e) $\sin(\pi/2) =$

(f) $\cos(0) =$

(g) $\cos(\pi/6) =$

(h) $\cos(\pi/4) =$

(i) $\cos(\pi/3) =$

(j) $\cos(\pi/2) =$

11. (10 pts.) In order to get a neat identity for $\cos(\alpha) + \cos(\beta)$, one begins with the identity

(*) $\cos(x + y) + \cos(x - y) = 2\cdot\cos(x)\cos(y)$

and sets $x + y = \alpha$ and $x - y = \beta$ in the left side of the identity. To make the substitution uniform, it is necessary to replace the "x" and "y" on the right side of (*) with what they are in terms of "α" and "β" in the system of linear equations

$$x + y = \alpha$$

$$x - y = \beta.$$

Solve for x and y in this system.