Problem 1. Given the function $y = \frac{1}{3}\sin(4x + 1)$, find the average value and period.

Problem 2. Given the following graph, find the maximum value, minimum value, and amplitude.
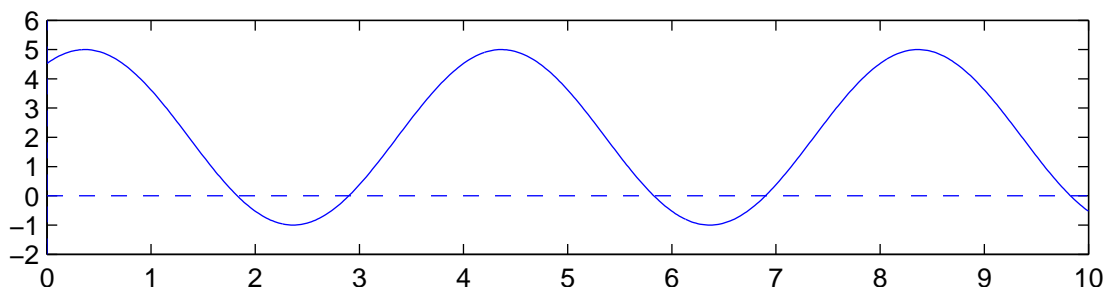
Problem 3. Write an equation for a sine function which passes through all the points in the following data table:

x	0	1	2	3	4	5
y	-1	3	7	3	-1	3

Problem 4. Which of the following correctly represents $\cos(-\theta) + \sin(-\theta)$?

(A) $\cos(\theta) + \sin(\theta)$ (B) $\cos(\theta) - \sin(\theta)$ (C) $-\cos(\theta) + \sin(\theta)$ (D) $-\cos(\theta) - \sin(\theta)$
(E) None of these.

Problem 5. Verify the following trigonometric identity. (Hint: use a sum identity and the Pythagorean identity.)

$$\cos(2x) = 1 - 2\sin^2(x).$$

Problem 6. Determine the exact value of $\sin(7\pi/12)$ using sum and/or difference identities.

Problem 7. If $\cos(\theta) = -4/5$ and $\sin(\theta) > 0$, find $\tan(\theta)$.

Problem 8. Which of the following is not an identity?

(A) $\sin^2(x) + \cos^2(x) = 1$ (B) $\cos(x+y) = \cos(x)\cos(y) + \sin(x)\sin(y)$
(C) $\sin(2x) = 2\sin(x)\cos(x)$ (D) $\cos(\pi/2 - x) = \sin(x)$
(E) These are all identities.

Problem 9. Find all solutions for $0 \le x < 2\pi$ (or, if you prefer, do it in degrees for $0° \le x < 360°$):
$$(\sin(x) + 1/2)(\sin(x) - 1/2) = 0.$$

Problem 10. Solve for x:
$$y = 5 \cos^{-1}(2x) + 3.$$

Problem 11. Find the exact value of $\cos(\sin^{-1}(-2/3))$.

Problem 12. Find the exact value of $\arcsin(\sin(135°))$.

Problem 13. Writing question: Why is it that $\tan^{-1}(2)$ is defined, while $\sin^{-1}(2)$ and $\cos^{-1}(2)$ are undefined?