MATH 133 – Calculus with Fundamentals 1
More Practice on Sinusoids – September 18, 2017

Suggestion

Try at least a few of the following problems *before* consulting the solutions that will be posted on the course homepage.

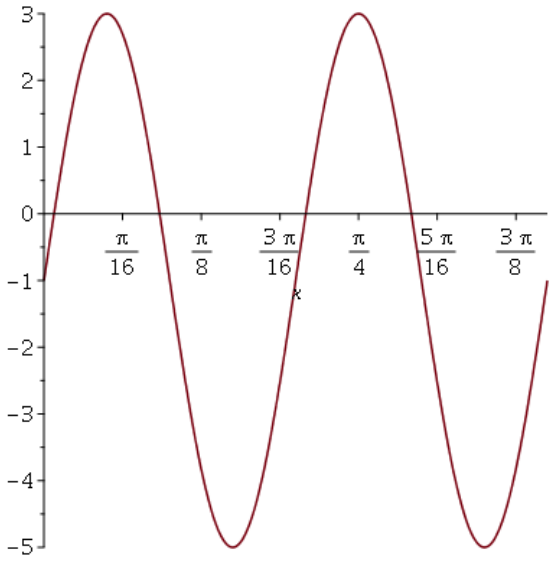

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Figure 1: The graph $y = 4\sin(10x) - 1$ from I (A).

I. Plot each of the following sinusoid graphs by determining the amplitude, period, and vertical shift:

(A) $y = 4\sin(10x) - 1$. Show the portion of the graph between $x = 0$ and $x = 2\pi/5$.

Solution: Amplitude is 4, vertical shift is -1 and $\frac{2\pi}{\text{period}} = 10$, so the period is $\frac{\pi}{5}$.

(B) $y = 2\cos(\pi x) + 2$. Show the portion of the graph between $x = 0$ and $x = 4$.

Solution: Amplitude is 2, period is $\frac{2\pi}{\pi} = 2$, vertical shift is 2. There are two complete periods for $0 \le x \le 4$.

(C) $y = -3\sin(x) + 4$. Show the portion of the graph between $x = -2\pi$ and $x = 2\pi$.

Solution: The amplitude is 3, but the -3 means the graph is also *reflected across the x-axis* before it is shifted up by 4. The period is 2π, as for the standard $\sin(x)$ graph.

II. Find possible formulas for each of the following sinusoidal graphs (starting on back):

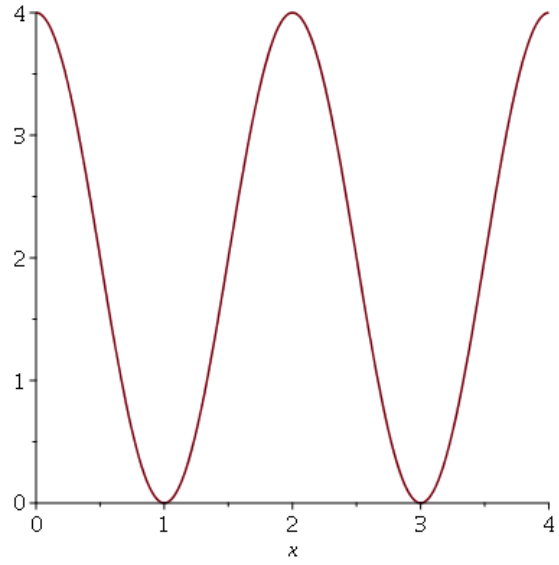

Figure 2: The graph $y = 2\cos(\pi x) + 2$ from I (B).

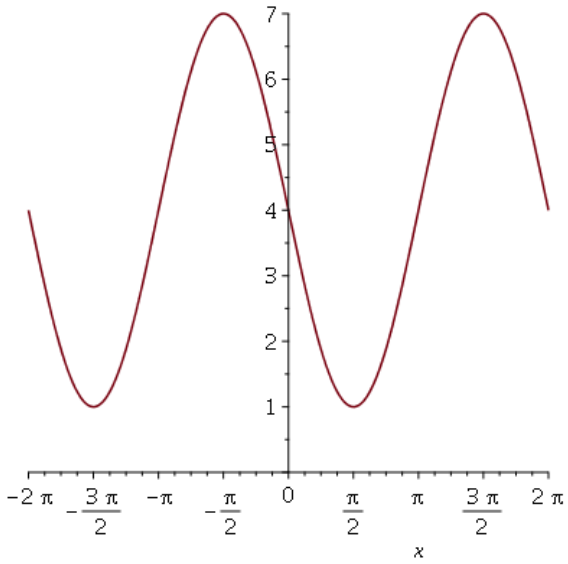

Figure 3: The graph $y = -3\sin(x) + 4$ from I (C).

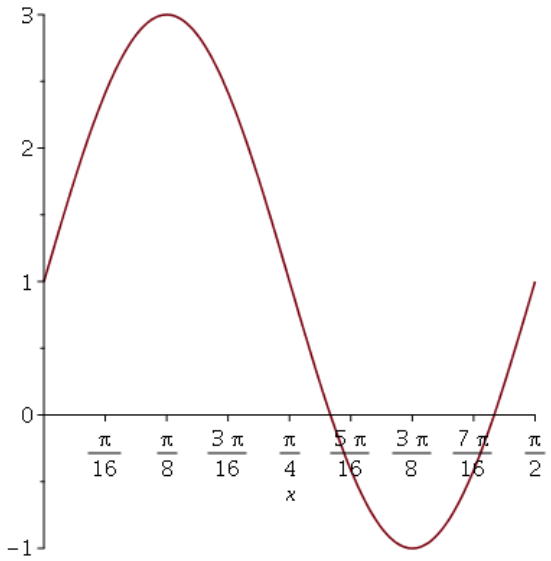

Figure 4: Sinusoid II (A) is $y = 2\sin(4x) + 1$

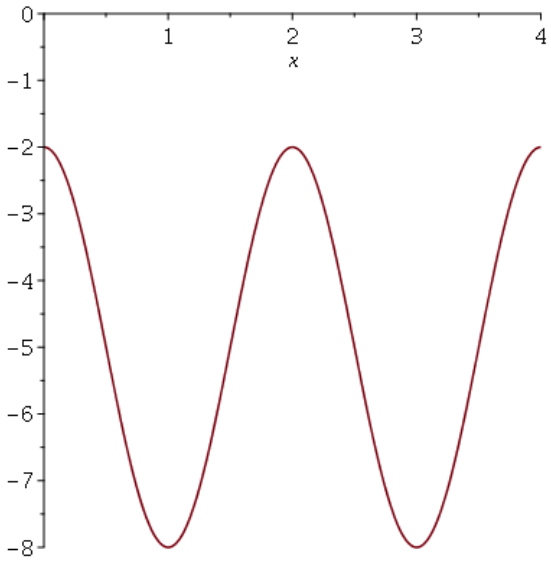

Figure 5: Sinusoid II (B) is $y = 3\cos(\pi x) - 5$

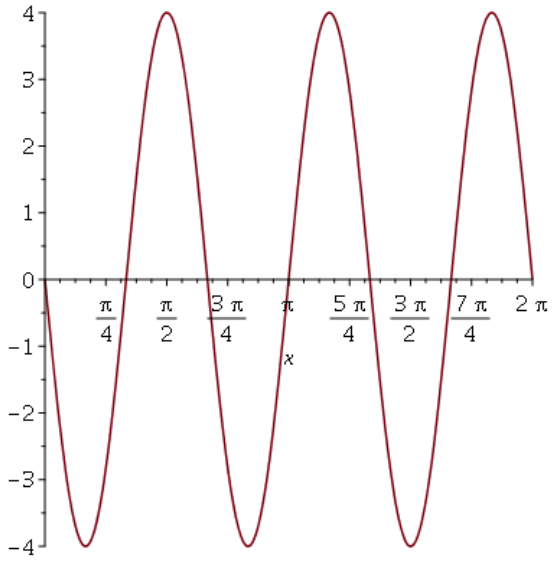

Figure 6: Sinusoid II (C) is $y = -4\sin(3x)$

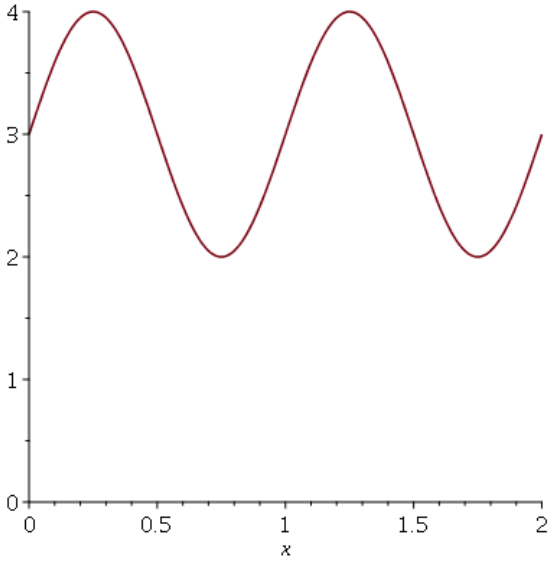

Figure 7: Sinusoid II (D) is $y = \sin(2\pi x) + 3$

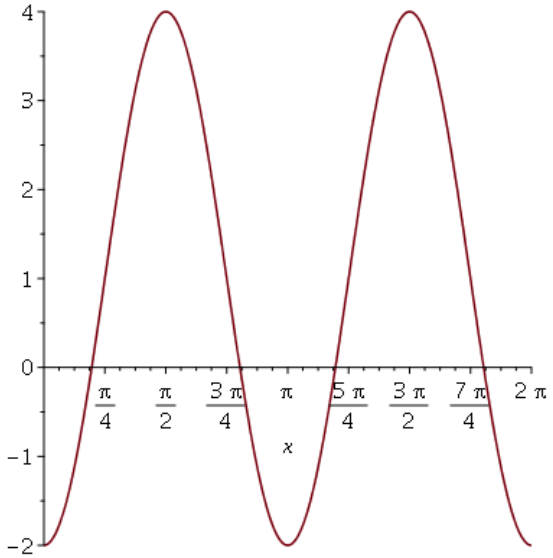

Figure 8: Sinusoid II (E) – more challenging(!) is $y = 3\sin(2(x - \pi/4)) + 1$