3.7 Sinusoidal Function Context and Data Modeling

AP Precalculus Name: _____ **CA #1**

1. The following data set can be modeled by a sinusoidal function. Use the data to answer each problem below.

x	0	1	2	3	4	5	6	7	8	9
$f(x)$	-60	-44	-27	-9	7	20	10	-8	-16	-40

x	10	11	12	13	14	15	16	17	18	19
$f(x)$	-58	-41	-12	-10	9	18	4	-5	-24	-49

a. Estimate the period and frequency.

b. Estimate the vertical shift (midline).

c. Estimate the amplitude.

d. Using the above information, create a sinusoidal function model.

e. Using a calculator, find a sinusoidal model from the given data set. Your answer should look similar to your estimate in part d.

2. The following data set can be modeled by a sinusoidal function. Use the data to answer each problem below.

x	0	1	2	3	4	5	6	7	8	9
$f(x)$	-294	-205	-168	-129	-109	-135	-207	-246	-301	-370

x	10	11	12	13	14	15	16	17	18	19
$f(x)$	-396	-335	-285	-250	-190	-131	-97	-122	-196	-251

a. Estimate the period and frequency.

b. Estimate the vertical shift (midline).

c. Estimate the amplitude.

d. Using the above information, create a sinusoidal function model.

e. Using a calculator, find a sinusoidal model from the given data set. Your answer should look similar to your estimate in part d.

Answers to 3.7 CA #1

1a. Period: 10 Frequency: $\frac{1}{10}$	1b. down -20	1c. 40	1d. $f(x) = 40\sin\left(\frac{\pi}{5}[x-2.5]\right) - 20$ or $f(x) = 40\cos\left(\frac{\pi}{5}[x-5]\right) - 20$
1e. $f(x) = 33.416\sin(0.637x - 1.657) - 16.322$			
2a. Period: 12 Frequency: $\frac{1}{12}$	2b. down -250	2c. 150	2d. $f(x) = 150\sin\left(\frac{\pi}{6}[x-1]\right) - 250$ or $f(x) = 150\cos\left(\frac{\pi}{6}[x-4]\right) - 250$
2e. $f(x) = 130.386\sin(0.516x - 0.36) - 243.588$			