

Lesson 24

Ch 19

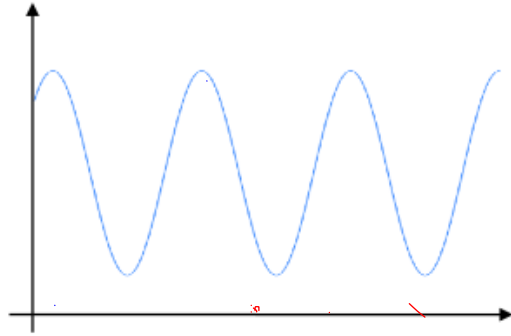
Sinusoidal

functions

problems

Spring 2012

Problem 7 (16 pts) The **depth** of a swimming salmon below the water surface can be modeled by a sinusoidal function of time. The salmon's depth varies between a minimum of 1 foot and a maximum of 7 feet below the surface of the water. It takes the salmon 1.8 minutes to move from its minimum depth to its successive maximum depth, and it first reaches the minimum depth at $t = 2$ minutes.



a) Find the sinusoidal function $d(t) = A \sin\left(\frac{2\pi}{B}(t - C)\right) + D$ which models the depth of the salmon after t minutes.

b) Compute all the times during the first 5 minutes when the depth of the fish is exactly 3 feet.

Win 2013

3. The temperature at your house in the desert is a sinusoidal function of time with a 24 hour period. The maximum daily temperature is 45 degrees Celsius and occurs at 5:00 PM. The minimum daily temperature is 11 degrees Celsius.

(a) Let t be hours after midnight last night. Find the function $f(t)$ that gives the temperature at time t .

(b) For how much of each day is the temperature above 35 degrees Celsius?

(c) Starting from midnight last night, how long will it be until the temperature has been above 35 degrees Celsius for 22 hours?

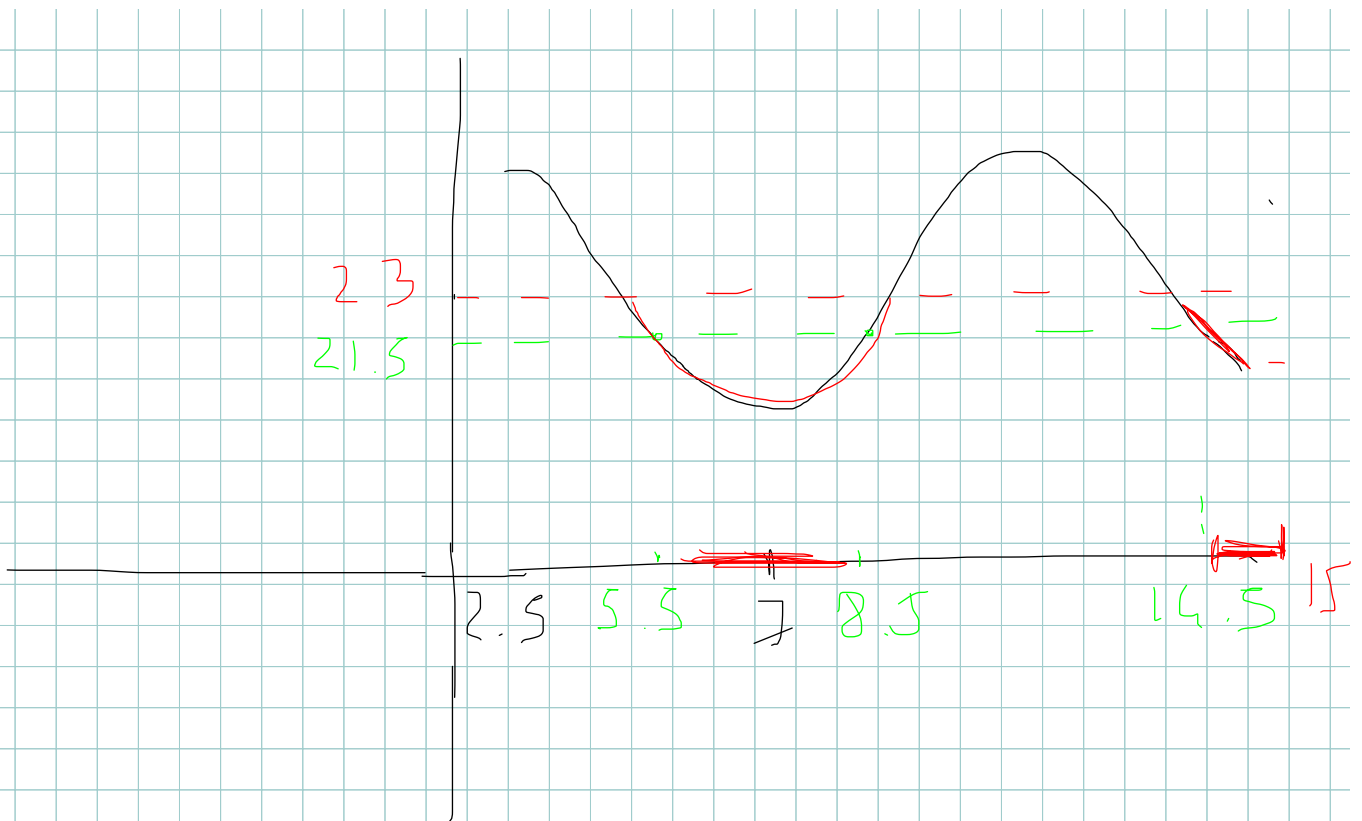
Fall 2012

5. The diameter of a certain cloud in the sky above Seattle is a sinusoidal function of time.

At 7 AM this morning, the diameter of the cloud was at its minimum, 20 meters.

The cloud then expanded, and reached its maximum diameter of 26 meters at 11:30 AM this morning.

From 3 AM this morning to 3 PM this afternoon, for how much time was the cloud's diameter less than 21.5 meters?



$$(8.5 - 5.5) + (15 - 14.5) = 3.5$$