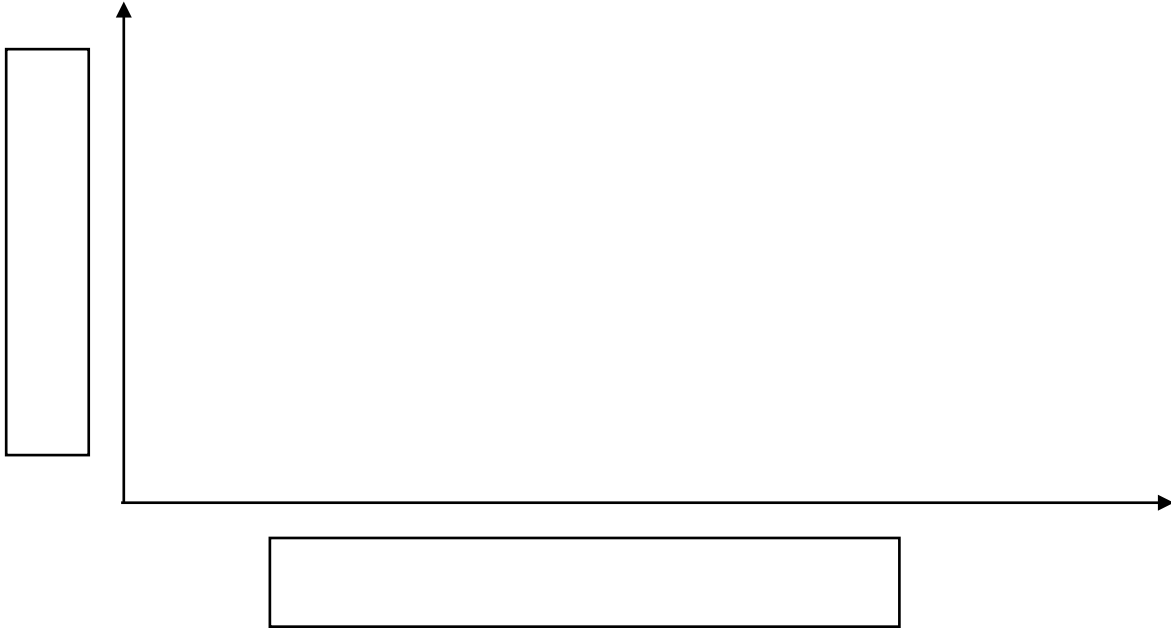


Trigonometric Graphing Applications
YOU CAN USE GRAPHING TECHNOLOGY ON ALL PARTS

In a fluctuating population of birds, the population is modeled by the function:

$$f(t) = 900 \cos\left(\frac{2\pi}{3}t\right) + 8000 \quad \text{where } t \text{ is measured in years.}$$

- a. Sketch a graph that represents the given population model.

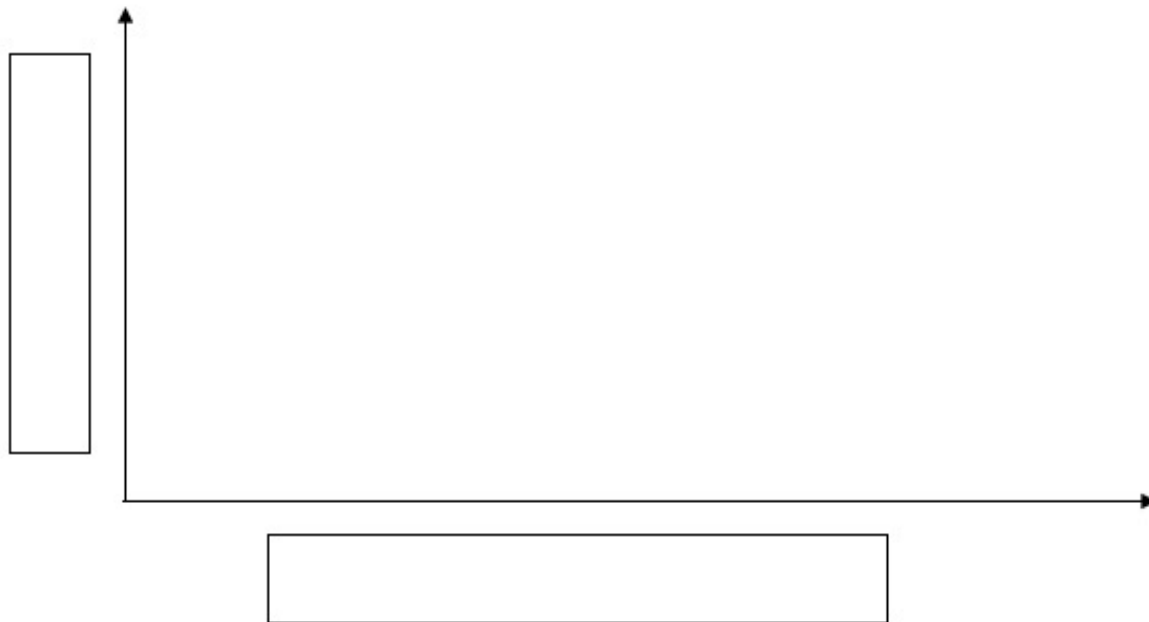


- b. Find the length of time between successive periods of maximum population.
- c. What is the minimum population? When does this occur in the first cycle?
- d. What is the average amount of birds over the open-ended time period?
- e. After 19 years, is the population of the birds increasing or decreasing?

Trigonometric Graphing Applications

A variable star is one whose brightness alternately increases and decreases. For the variable star *HAMSTAR*, the time between periods of maximum brightness is 5.4 days. The average brightness of the star is 4.0, and its brightness varies by a magnitude of 0.35.

- a. If the ***HAMSTAR*** is at its brightest at $t = 0$, sketch a graph that represents the star's brightness with respect to time.



- b. Find a function that models the brightness as a function of time.

trig: _____

A = _____ B = _____

C = _____ D = _____

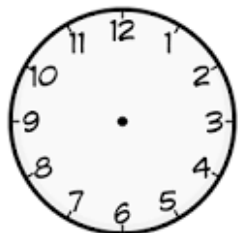
Final Build: _____

- c. At what point will the star be at its dimmest? What is its magnitude?

- d. What is the magnitude of brightness after 2 weeks?

Trigonometric Graphing Applications

The height in cm of the tip of a second hand (the hand that keeps track of seconds) on a vertical clock face varies as a function of time in seconds. The second hand is 20 cm long, and the middle of the clock face is 225 cm above the ground.



-
- a. Find a function to model the height of the second hand as a function of time assuming the hand is at the 9 o'clock position to start.

trig: _____

A = _____ B = _____

C = _____ D = _____

Final Build: _____

- b. How far above the ground is the tip of the second hand after 15 seconds?
- c. How far above the ground is the second hand when it reaches the 8 o'clock mark?
- d. Find the first time that the hand is 212 cm above the ground.