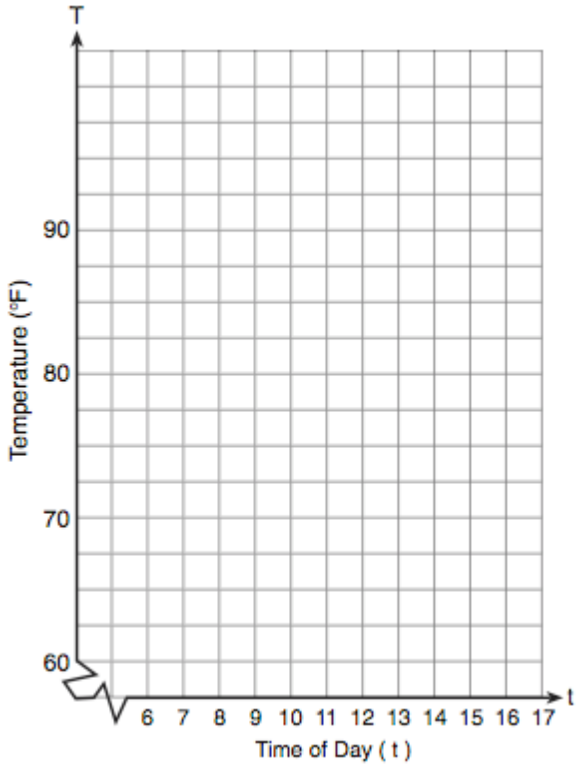
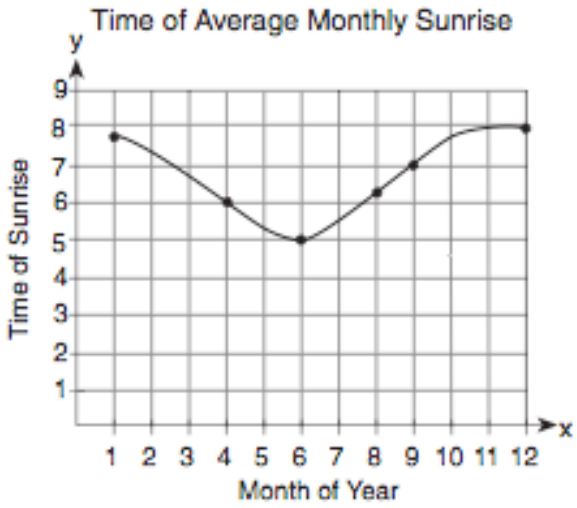
Vertical Shifts of Trigonometric Graphs – Practice

1. A building's temperature, T, varies with time of day, t, during the course of 1 day, as follows: $T = 8\cos t + 78$. The air-conditioning operates when $T \geq 80°F$. Graph this function for $6 \leq t < 17$ and determine, to the *nearest tenth of an hour*, the amount of time in 1 day that the air-conditioning is on in the building.



2. The times of average monthly sunrise, as shown in the accompanying diagram, over the course of a 12-month interval can be modeled by the equation $y = A\cos(Bx) + D$. Determine the values of A, B, and D, and explain how you arrived at your values.



3. The path traveled by a roller coaster is modeled by the equation $y = 27\sin 13x + 30$. What is the maximum altitude of the roller coaster?

(1) 13 (2) 57 (3) 3 (4) 30