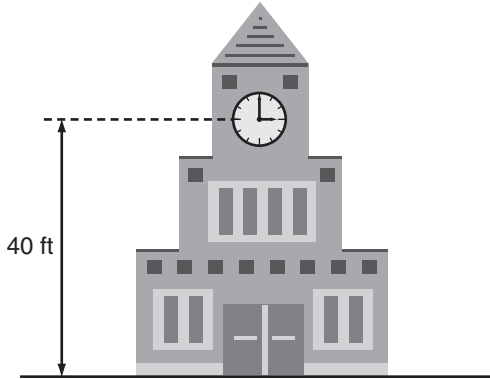


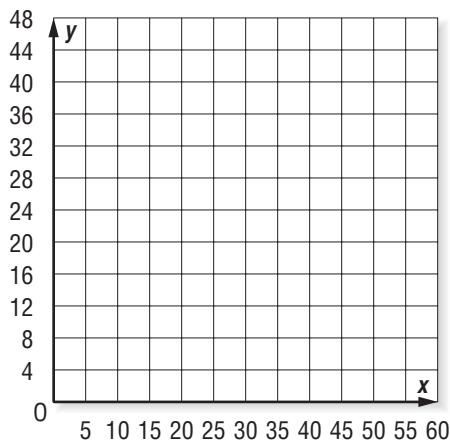
# 13-8 Word Problem Practice

## Translations of Trigonometric Graphs

- 1. CLOCKS** A town hall has a tower with a clock on its face. The center of the clock is 40 feet above street level. The minute hand of the clock has a length of four feet.



- What is the maximum height of the tip of the minute hand above street level?
- What is the minimum height of the tip of the minute hand above street level?
- Write a sine function that represents the height above street level of the tip of the minute hand for  $t$  minutes after midnight.
- Graph the function from your answer to part c.



- 2. ANIMAL POPULATION** The population of predators and prey in a closed ecological system tends to vary periodically over time. In a certain system, the population of snakes  $S$  can be represented by  $S = 100 + 20 \sin\left(\frac{\pi}{5}t\right)$ , where  $t$  is the number of years since January 1, 2000. In that same system, the population of rats can be represented by  $R = 200 + 75 \sin\left(\frac{\pi}{5}t + \frac{\pi}{10}\right)$ .

- What is the maximum snake population?
- When is this population first reached?
- What is the minimum rat population?
- When is this population first reached?