

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## 5.2 The Sine Function and the Cosine Function

**BLM 5-5**

1. At a maximum height of 135 m, the Millennium Wheel, in London, England, is the largest cantilevered structure in the world. It moves so slowly that there is usually no need to stop the wheel to let people on or off. Let the origin be the centre of the wheel.
  - a) Start a sketch of the horizontal displacement of a car on the wheel as a function of the angle through which the wheel rotates, using the bottom of the wheel as the starting point of the trip.
  - b) Which function describes this motion?
  - c) Determine the amplitude and period of the function.
2. Repeat question 1, this time using vertical displacement instead of horizontal displacement.
3.
  - a) Can a function have an interval of increase, yet exist below the  $x$ -axis? Explain and use an example from this section.
  - b) Create a sketch of your example.
4.
  - a) Can a function have an interval of decrease, yet exist above the  $x$ -axis? Explain and use an example from this section.
  - b) Create a sketch of your example.
5. Without using a calculator, create a sketch of two cycles of a sine function, starting at an angle of  $-30^\circ$ .
6. Without using a calculator, create a sketch of two cycles of a cosine function, starting at an angle of  $-60^\circ$ .

