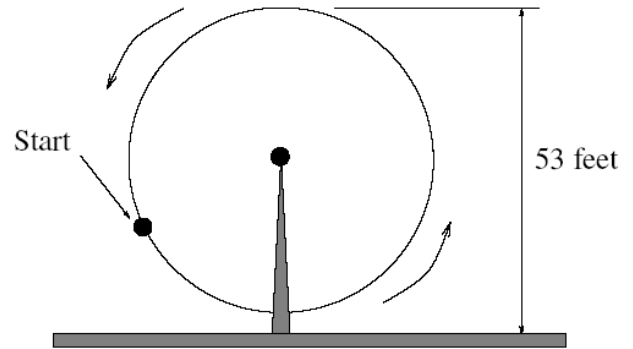


Directions: Work in groups of 2-3 people. You may need extra paper.

**1** At  $t = 0$  you are seated on a Ferris wheel at the position shown, which is  $\frac{\pi}{4}$  radians away from the lowest point on the ride. Let  $t$  be the number of seconds elapsed after the wheel begins rotating counterclockwise. The wheel is rotating at 12 revolutions per minute (RPM) and the diameter is 50 feet. Let  $d(t)$  be your height above the ground at time  $t$ .



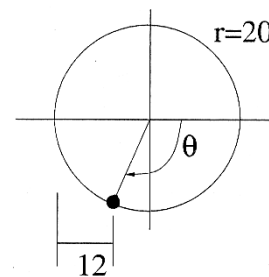
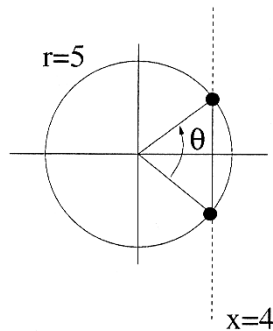
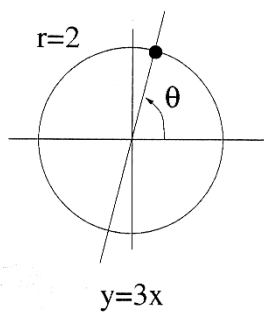
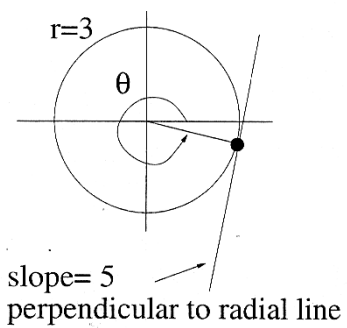
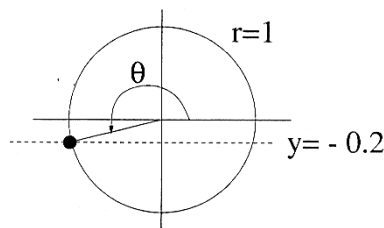
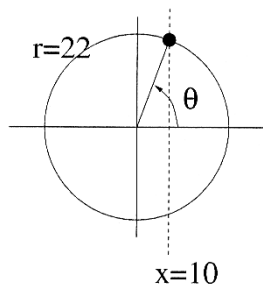
(a) Give a formula for  $d(t)$ .

(b) When are the first and second times you are exactly 28 feet above the ground?

(c) After 29 seconds, how many times will you have been exactly 28 feet above the ground?

- 2** Find all solutions algebraically:  $\sin(2x)\sin x = \cos x$   
 (Note:  $\sin(2x) = \sin(x+x)$ )

- 3** Find the angle  $\theta$  in each of the pictures. Give a decimal answer in radians accurate to 3 places after the decimal point.



- 4** Find the unknown angles and sides in each of the triangles.

