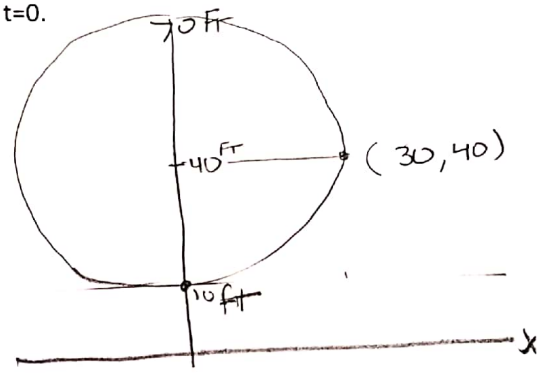
Honors Pre-Calculus Application Name Key Hour____

Riding on a Ferris Wheel

Jane is riding on a Ferris wheel with a radius of 30 feet. The wheel is turning counterclockwise at a rate of one revolution every 30 seconds. Assume that the lowest point of the Ferris wheel (6 o'clock position) is 10ft above the ground and that Jane is at the 3 o'clock position at time t=0.

Draw a diagram of the described situation



$\frac{\pi}{15}$ rad/sec

$\theta = \frac{2\pi}{30} t$ sec

A parametric equation for a curve is based off the graph of the ordered pairs (x,y) where x= f(t) and y = g(t).

Find parametric equations to model Jane's path with respect to time.

*Consider the number of radians per second traveled for the angle-do not use rounded values) $\frac{\pi}{15}$ rad/sec

*Which trigonometric function represents the horizontal distance from the y-axis? cosθ

*Which trigonometric function represents the vertical distance from the x-axis? sinθ

$= 30\cos\left(\frac{\pi}{15}t\right)$

$y = 40 + 30\sin\left(\frac{\pi}{15}t\right)$

t = # of seconds $t \geq 0$

Use the parametric equations to find Jane's position 22 seconds into the ride.

$x = 30\cos\left(\frac{\pi}{15} \cdot 22\right)$

-3.14 ft

$y = 40 + 30\sin\left(\frac{\pi}{15} \cdot 22\right)$

10.16 ft

22 seconds into the ride Jane is 3.14 ft west of the y-axis and 10.16 ft above ground