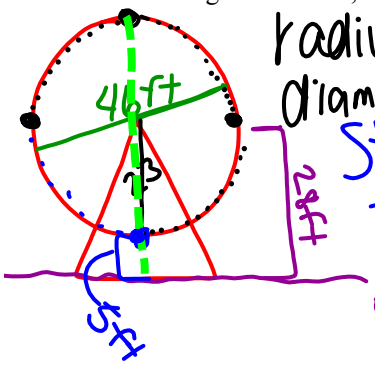
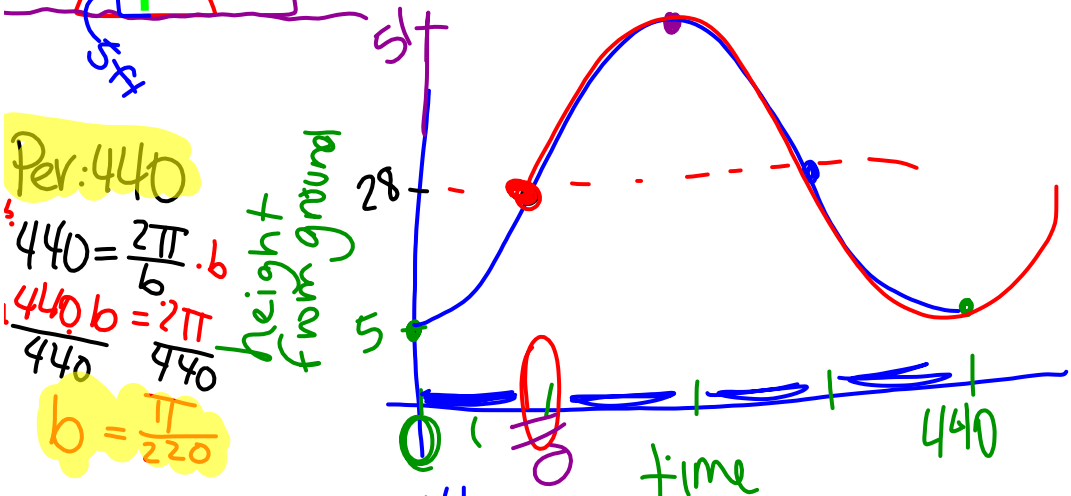
A Ferris wheel at the local fair travels through one complete rotation every 440 seconds. Point P is located where one of the gondolas (yes, they are called gondolas) is attached to the Ferris wheel. The diameter of the Ferris wheel is 46 feet and the center is 28 feet above the ground. Write a cosine equation for the vertical distance that the point P is above the ground. The equation must be in terms of time, t, in seconds. Assume that at t = 0, point P is at its minimum distance from the ground. Then, write a sine equation.

Per = 440



radius = 23
diameter: 46
Start 5ft from ground



Per: 440

$440 = \frac{2\pi}{b}$

$\frac{440}{440}b = \frac{2\pi}{440}$

$b = \frac{\pi}{220}$

$Amp = \frac{51-5}{2} = \frac{46}{2} = 23$ (Radius)

$VS = 51 - 23 = 28$ (center above ground)

$$f(x) = -23\cos\left(\frac{\pi}{220}x\right) + 28$$

$\frac{440}{4} = 110 = SP$

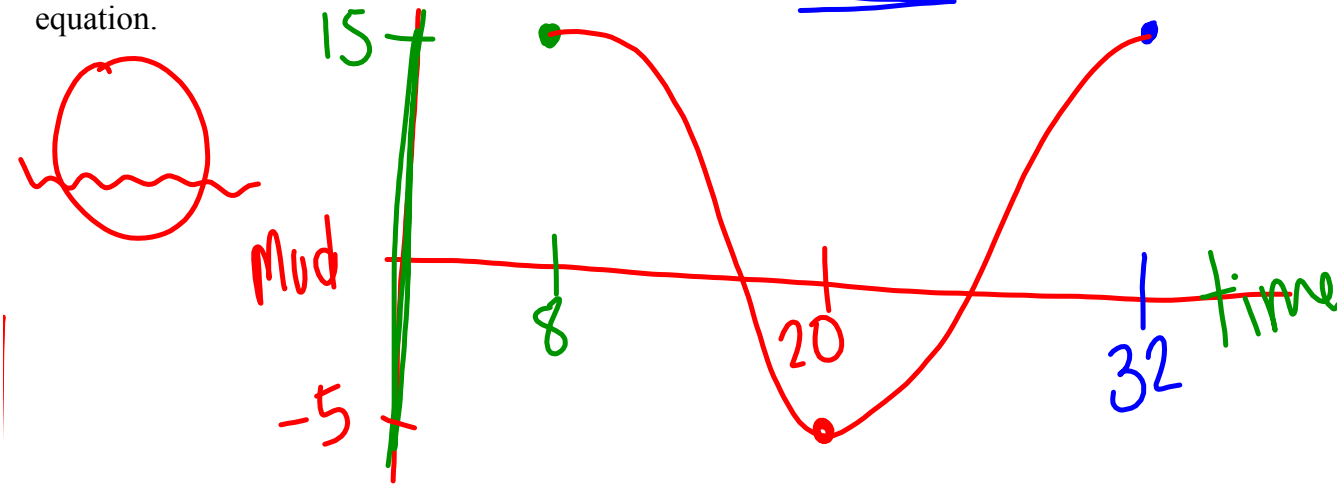
HS

$\frac{\pi}{220}(x - 110)$ $\frac{110\pi}{220}$

$\left(\frac{\pi}{220}x - \frac{\pi}{2}\right)$

$$f(x) = 23\sin\left(\frac{\pi}{220}x - \frac{\pi}{2}\right) + 28$$

Jenny observed a car tire stuck in mud that was continuously turning at a constant rate. She used her stopwatch and noted that after 8 sec, a rust spot on the perimeter of the wheel was at its highest point, 15in above the mud level. After an additional 12 sec, the rust spot was at its lowest point, 5in below the surface of the mud. Draw a cosine curve that models the distance of the rust spot in relation to the surface of the mud from 8 sec to 32 sec. Then write the equation.



Per: $32-8=24$

$24=\frac{2\pi}{b}$

$24b=2\pi$

$b=\frac{2\pi}{24}=\frac{\pi}{12}$

$Amp=\frac{15--5}{2}=10$

VS: $15-10=5$.

SP = 8

$\frac{\pi}{12}(x-8)$

$\left(\frac{\pi}{12}x-\frac{8\pi}{12}\right)$

$$f(x)=10\cos\left(\frac{\pi}{12}x-\frac{2\pi}{3}\right)+5$$