Homework 7.9: Applications of Trig Functions Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Math 3

1. **A water wheel on a paddleboat has a radius of 1 m. The wheel rotates once every 1.46 seconds and the bottom 0.3 m of the wheel is submerged in water. (Consider the water surface to be the x-axis.**



1. Determine the cosine equation of the graph, starting from a point at the top of the wheel.
2. Graph the height of a point on the wheel relative to the surface of the water, starting from the highest point.
3. How long is the point on the wheel underwater?
4. **The bottom of a windmill is 8m above the ground, and the top is 22m above the ground. The wheel rotates once every five seconds.**
5. Determine the cosine equation of the graph, starting from a point at the bottom of the windmill.



1. Draw the graph of two complete cycles.
2. What is the height of the point after 4 seconds?
3. For how long (*over the course of both cycles*) is the wheel above 17 m?
4. **A point on an industrial flywheel experiences a motion described by the formula:** $h\left(t\right)=13cos\frac{2π}{0.7}t+15$



1. What is the maximum height of the point?
2. At what time is the maximum height reached?
3. What is the minimum height of the point?
4. At what time is the minimum height reached?
5. How long, within one cycle, is the point lower than 6 m above the ground?
6. What is the height of the point if the wheel turns for 2 hours and 20 minutes?