MHF4U: Grade 12 Advanced Functions (Public)

Unit 4: Trigonometric Functions
Activity 6: Solving Problems

Formative Assignment

1) The water at a local beach has an average depth of 1metre at low tide. The average depth of the water at high tide is 8 metres. One cycle of the tides takes approximately 12 hours.
    a. Determine an equation for the periodic function assuming that the water level is at the low tide mark at midnight ($t = 0$).
    b. How deep will the water be at 2 am?
2) While Erin pushes her daughter on the swing, she notices that the furthest her daughter gets away from her is 3m. The time between each push is approximately 2 seconds.
    a. Write an equation of a sinusoidal function that models the distance of the child away from Erin assuming that at time zero Erin is about to push the swing.
    b. What does the axis of the curve represent in this situation?
    c. What does the amplitude represent in this situation?
    d. What would the domain of this function be?
3) A paintball gun is shot at the side of a wheel of a passing car. The paintball leaves a mark on the tire 5cm in from the edge of the tire. The radius of the tire is 20cm. As the car continues to drive the paintball splatter rises and falls like a periodic function. At its current speed the tire is making four revolutions every second. Determine the equation of a sinusoidal function that will model this situation, assuming that the splatter is at its maximum height at time zero.