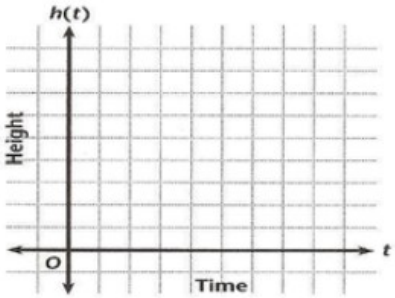
# Roller Coaster Calculus Worksheet

Purpose:
Roller Coasters rely on polynomial functions in their design. In this project you will both analyze roller coaster polynomials and track your feelings in relation to time on a roller coaster while making predictions about velocity.

Part 1:

1. The brochure for the coaster says that, for the first 10 seconds of the ride, the height of the coaster can be determined by $h(t) = 0.3t^3 - 5t^2 + 21t$, where t is the time in seconds and h is the height in feet. Give three facts you know about this rollercoaster based on the equation. Think about the key aspects of the graph.

2. Graph the polynomial function for the height of the roller coaster on the coordinate plane at the right.




3. Find the height of the coaster at t = 0 seconds. Explain why this answer makes sense.

4. Find the height of the coaster 9 seconds after the ride begins. Explain how you found the answer.

5. Evaluate h(60). Does this answer make sense? Identify practical (valid real life) domain of the ride for this model. CLEARLY EXPLAIN your reasoning. (Hint.: Mt. Everest is 29,028 feet tall.)

Part 2:

Take a look at this https://www.desmos.com/calculator/cizighkevu Desmos Roller Coaster what sections look familiar can you describe the intervals for three classic roller coaster elements ex. Drops, loops, slow down etc.

Part 3:
Watch the following video: https://www.youtube.com/watch?v=KgZsZA16_tw and in the table below chart how you felt at 5 separate timestamps, what was the slope and describe the rate of change.

| Time | Feelings | Slope | Rate of Change |
|---|---|---|---|
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