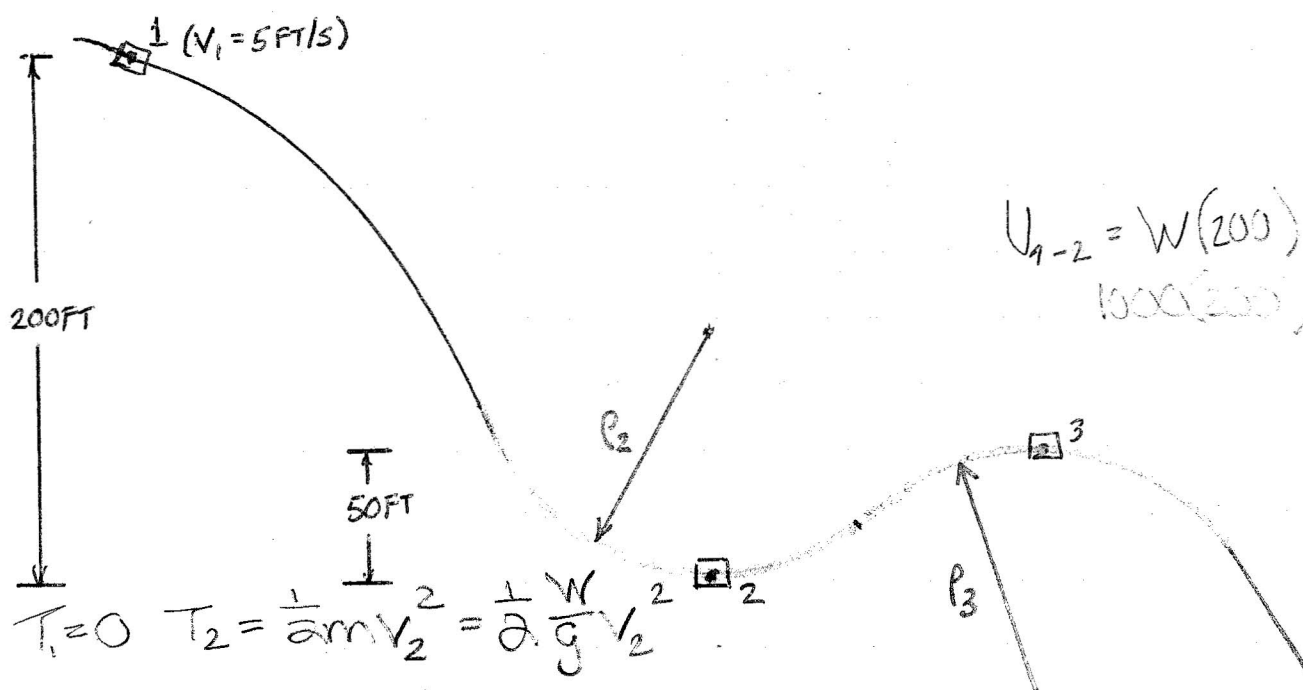


5. CONSIDER THE ROLLER COASTER CAR AND THE TRACK SHOWN BELOW. NEGLECT THE EFFECTS OF FRICTION AND AIR RESISTANCE. THE CAR AND OCCUPANTS WEIGH 1000 LB.

(a) DETERMINE THE RADIUS P_2 OF THE TRACK AT POINT 2 IF $N = 4W$.

(b) DETERMINE THE MINIMUM SAFE VALUE OF (P_3) AT POINT 3.

(c) WHAT IS THE MINIMUM SAFE WEIGHT OF THE CAR AND OCCUPANTS AT POINT 3?



$$T_1 = 0 \quad T_2 = \frac{1}{2} m v_2^2 = \frac{1}{2} \frac{W}{g} v_2^2$$

$$U_{1 \rightarrow 2} = W(200) = \frac{1}{2} \frac{W}{g} v_2^2 \quad v_2^2 = 400(32.2) = 12880$$

$$\sum F_n = m a_n \quad -W + N = m a_n = \frac{W}{g} \frac{v_2^2}{P} \quad \frac{W}{g P} \quad \frac{1000}{9.81} \quad \frac{12880}{9}$$