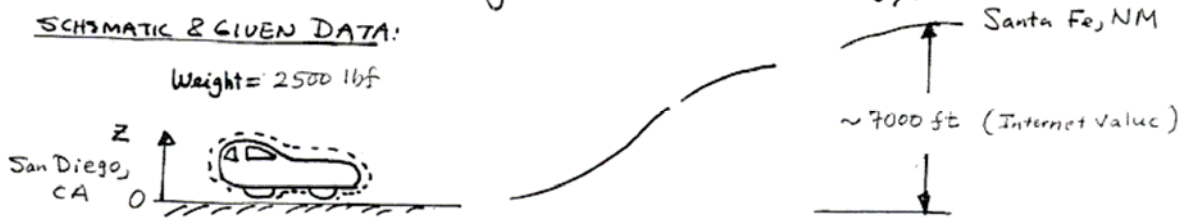


PROBLEM 2.5

KNOWN: An automobile of known weight travels from sea level to a known elevation.

FIND: Determine the change in potential energy.

SCHEMATIC & GIVEN DATA:



ENGR. MODEL: 1. As shown in the schematic, the automobile is the closed system. 2. The acceleration of gravity is constant.

ANALYSIS: The change in potential energy is

$$\Delta PE = mg(z_2 - z_1)$$

The quantity mg is recognized as the vehicle weight. Thus, inserting known values

$$\Delta PE = (2500 \text{ lbf})(7000 \text{ ft}) \left| \frac{1 \text{ Btu}}{778 \text{ ft} \cdot \text{lbf}} \right| = 2.25 \times 10^4 \text{ Btu} \quad \leftarrow$$