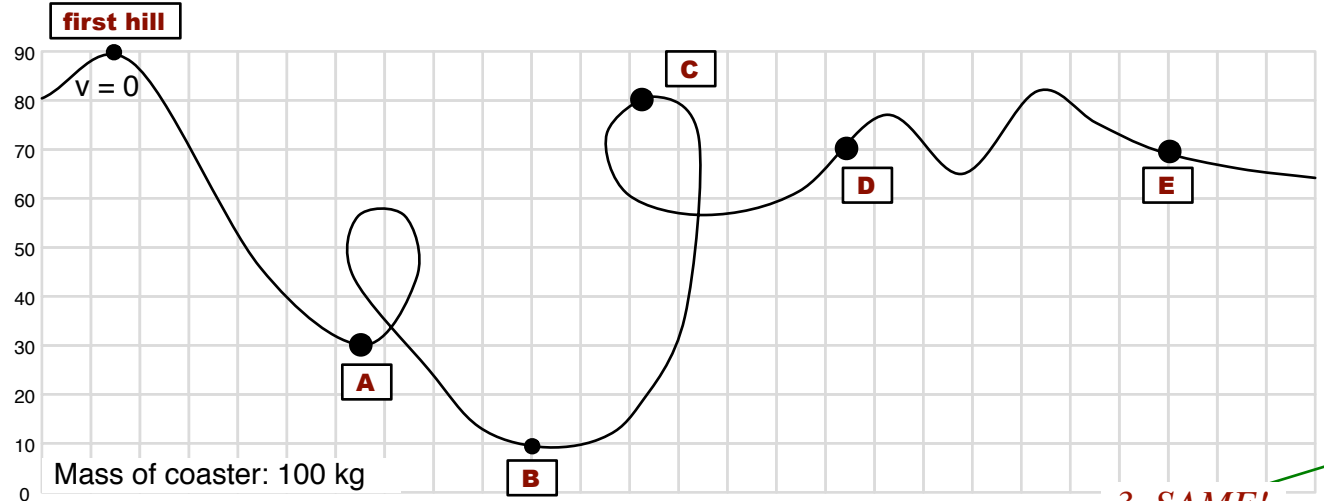


D1: SAMPLE



$$KE = \left(\frac{m}{2}\right)(v^2)$$

$$GPE = mgh$$

$$= (kg)(10)(meters)$$

1. On the first hill, $KE = 0$ because it starts from rest. All the energy is GPE

2. Use the GPE formula: m is mass in kg, g is 10, and h is the height in meters from the scale on the side of the coaster.

Total Mech E: 90,000 J	
KE	+ GPE
0	90,000 J

$$KE = 0$$

$$GPE = mgh$$

$$= (100\text{ kg})(10)(90\text{ meters})$$

$$= 90,000\text{ J}$$

3. SAME!

4. Don't worry about KE yet. Instead, calculate GPE at the new spot. Look up the height of A on the scale on the side of the coaster.

Total Mech E: 90,000 J	
KE	+ GPE
60,000 J	30,000 J

$$GPE = mgh$$

$$= (100\text{ kg})(10)(30\text{ meters})$$

$$= 30,000\text{ J}$$

5. GPE + KE has to add to the Total Mech. E., so subtract to get KE.

$$\text{So } KE = 90,000\text{ J} - 30,000\text{ J}$$

$$KE = \left(\frac{m}{2}\right)(v^2)$$

6. Finally, use the KE formula to calculate the velocity.

$$60,000 = \left(\frac{100}{2}\right)(v^2)$$

$$60,000 = (50)(v^2)$$

divide the 50 to the other side.

$$1,200 = (v^2)$$

$$\sqrt{1,200} = v$$

SQUARE ROOT to get an answer.

$$34.6\text{ m/s} = v$$