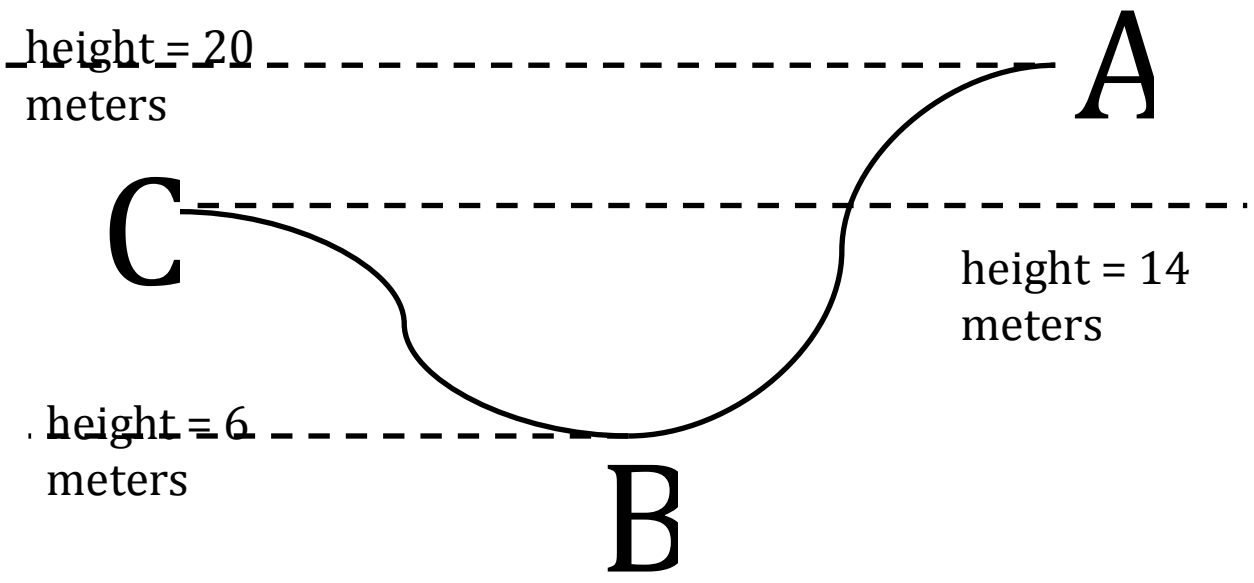
Falling Problems Level 3 Name _____

$$GPE = mgh$$
$$KE = \frac{1}{2}mv^2$$



Someone is biking on a giant hill. She begins **at rest** at point A, then falls to point B, and then rises back up to point C. She doesn't peddle her bike, but just lets the fall and rise carry her speed. Assume there is no friction or air resistance in this problem. The girl and her bike combined have a mass of 90 kg.

1. What is the *kinetic* energy at point A (no equation)? [1point]

She falls down from point A to point B: [1 point each]
2a. Does kinetic energy increase, decrease, or stay the same?

2b. Does gravitational potential energy increase, decrease, or stay the same?

2c. Does total energy increase, decrease, or stay the same?

Then, she rises back up from point B to point C: [1 point each]
3a. Does kinetic energy increase, decrease, or stay the same?

3b. Does gravitational potential energy increase, decrease, or stay the same?

3c. Does total energy increase, decrease, or stay the same?

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4. Find the girl's gravitational potential energy at each point: [4 points total]

4a. at point A:

4b. at point B:

4c. at point C:

5. Complete the following table: [3 points total]

	KE (J)	**GPE (J)**	**Total Energy (J)**
A			
B			
C			

6a. What is the maximum kinetic energy of the girl? [1 point]

6b. Why is her maximum kinetic energy less than her maximum GPE? [1 points]

7a. Find the girl's speed at point B: [2 points]

7b. Find the girl's speed at point C: [2 points]

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Answers

1. Zero

2a. increase

2b. decrease

2c. stays the same

3a. decrease

3b. increase

3c. stays the same

4a. 17,640 J

4b. 5,292 J

4c. 12,348 J

5.

	KE (J)	**GPE (J)**	**Total Energy (J)**
A	0	17,640	17,640
B	12,348	5,292	17,640
C	5,292	12,348	17,640

6a. What is the maximum kinetic energy of the girl? [1 point]

6b. Why is her maximum kinetic energy less than her maximum GPE? [1 points]

7a. Find the girl's speed at point B: [2 points]