Beth:D Kevin:H Switch

Judge View | Tree View | List of Debates | Hide notes | Side: None | Phase: **Answer Questions** Remaining: **6:00**

At root

0 Q (H): A train is coasting around a large circular track. It is then switched to a smaller circular track. How does its speed change? Assume no friction, and assume the train is a point mass

H: Its speed does not change

D: It's unclear, different models suggest its speed might increase or decrease or stay the same

Notes:

Q: If nothing interacting with the train changes its energy, does the train's energy remain constant?

H: Yes

D: Yes, very likely

1 Payment: H D None Recurse

Notes:

Q: If the train's energy remains constant, does the train's velocity remain constant?

H: Yes

D: Yes, very likely

3 Payment: H D None Recurse

Notes: Kevin meant magnitude of velocity (speed) here, not velocity itself

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Q: Does anything that interacts with the train (e.g. the rails) change in energy?

H: No

D: The earth might change in energy

5 Payment: H D None Recurse

Q: Can we view the situation in a rotating reference frame, where the frame is rotating at the same rate as the train is initially traveling round the

H: Yes

D: Yes

2 Payment: H D None Recurse

Notes: beth is imagining something like 'suppose the tracks are on a rotating table (from your frame of reference) such that the train appears to be still initially (from your frame of reference)

Q: In a rotating reference frame, does the speed of the train increase in some circumstances and decrease in others?

H: Unsure, but these speed changes would not appear in an inertial reference frame

D: Probably

4 Payment: H D None Recurse

Notes: beth means - when you transform into rotating reference frame, you need to add in correction factors for coreolis + centrifugal force, and depending on the parameters of track, rotation speed etc, the train will either speed up or slow down

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Q: Do other models (conservation of angular momentum in a non-rotating reference frame) suggest its speed increases?

Notes

H No, conservation of angular momentum does not apply

D Yes, although it's not clear whether this conservation law actually applies to this system

6 Payment: H D None Recurse

Notes Kevin means that the conservation of angular momentum is inapplicable here, so you couldn't construct a valid model from it

Q Do other models (conservation of energy in a non-rotating reference frame) suggest its speed stays unchanged, similarly strongly as the previous argument?

H Yes

D Yes, although it's not clear whether this conservation law actually applies to this system

7 Payment: H D None Recurse

Notes I'm going to argue that conservation of energy is about as plausible as conservation of angular momentum, as both angular momentum and energy could be transferred to the earth