March 21, Week 9

Today: Chapter 7, Energy

Homework #7:
Mastering Physics: 6 problems from chapter 7
Written Question: 7.60
Due Monday, March 26 at 11:59pm

Written Homework #5 in mailboxes.

If your exam was not in your mailbox, please come see me.

Review

Potential Energy, U - Saved or stored energy, *i.e.*, energy that can be converted into kinetic energy at a later time.

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Conservation of Energy - If only conservative forces do work on an object, its total energy cannot change.

Total Energy, E = the sum of kinetic and potential energy.

$$\boxed{E = K + U}$$

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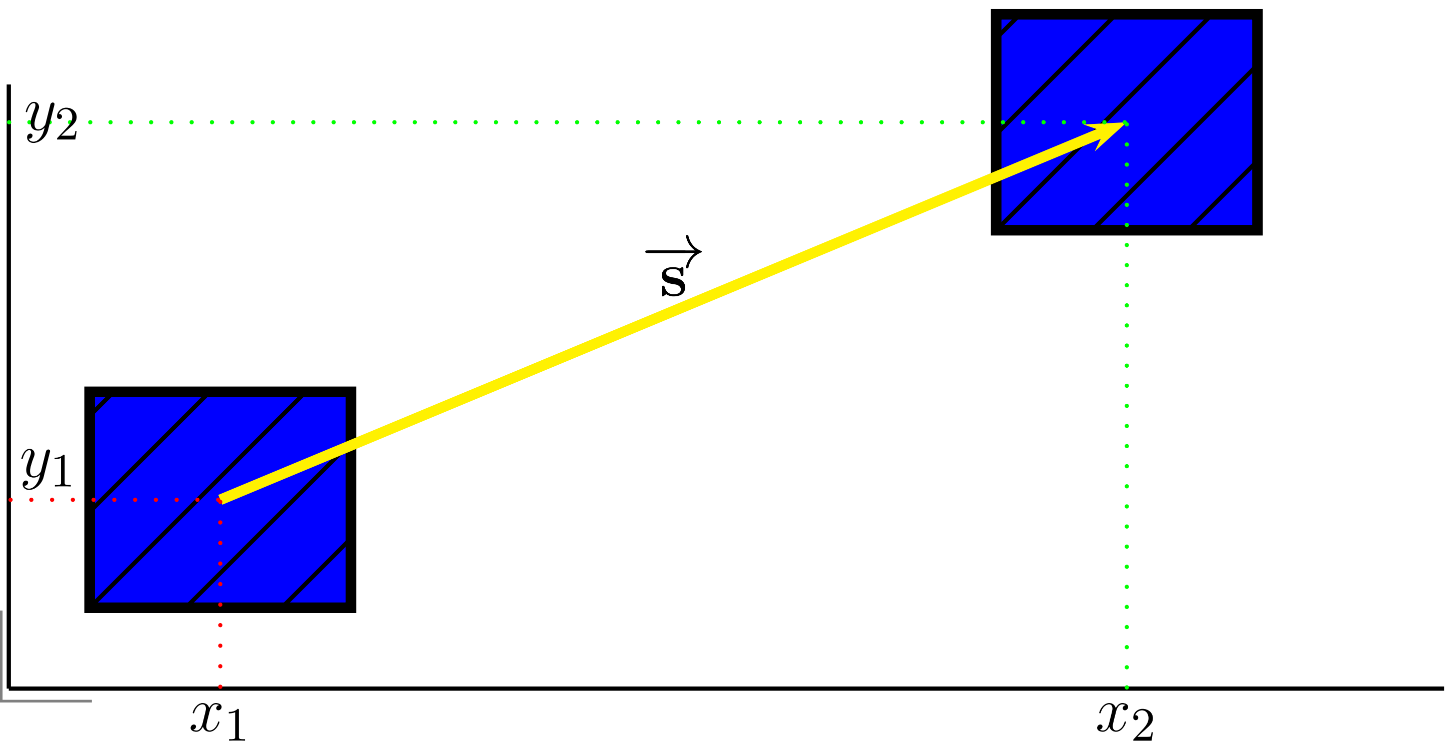

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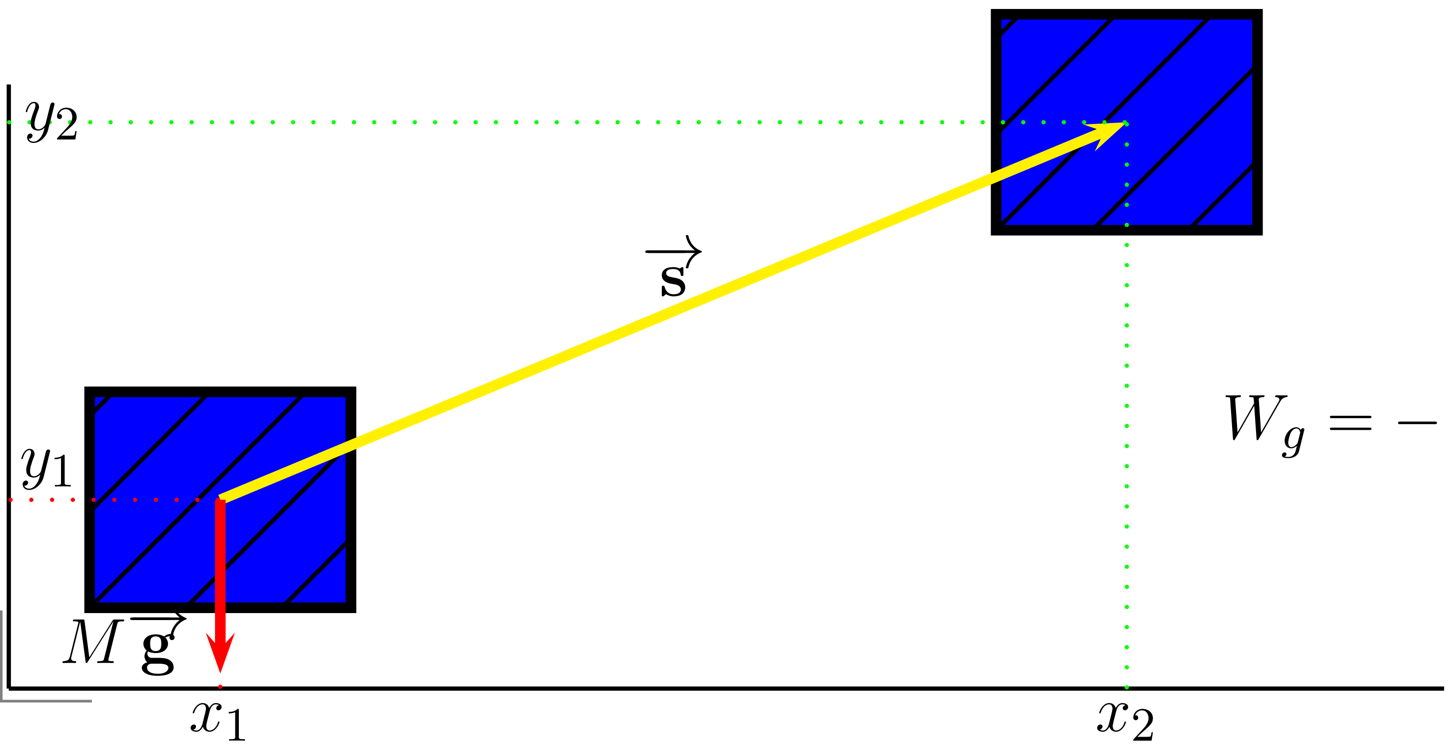

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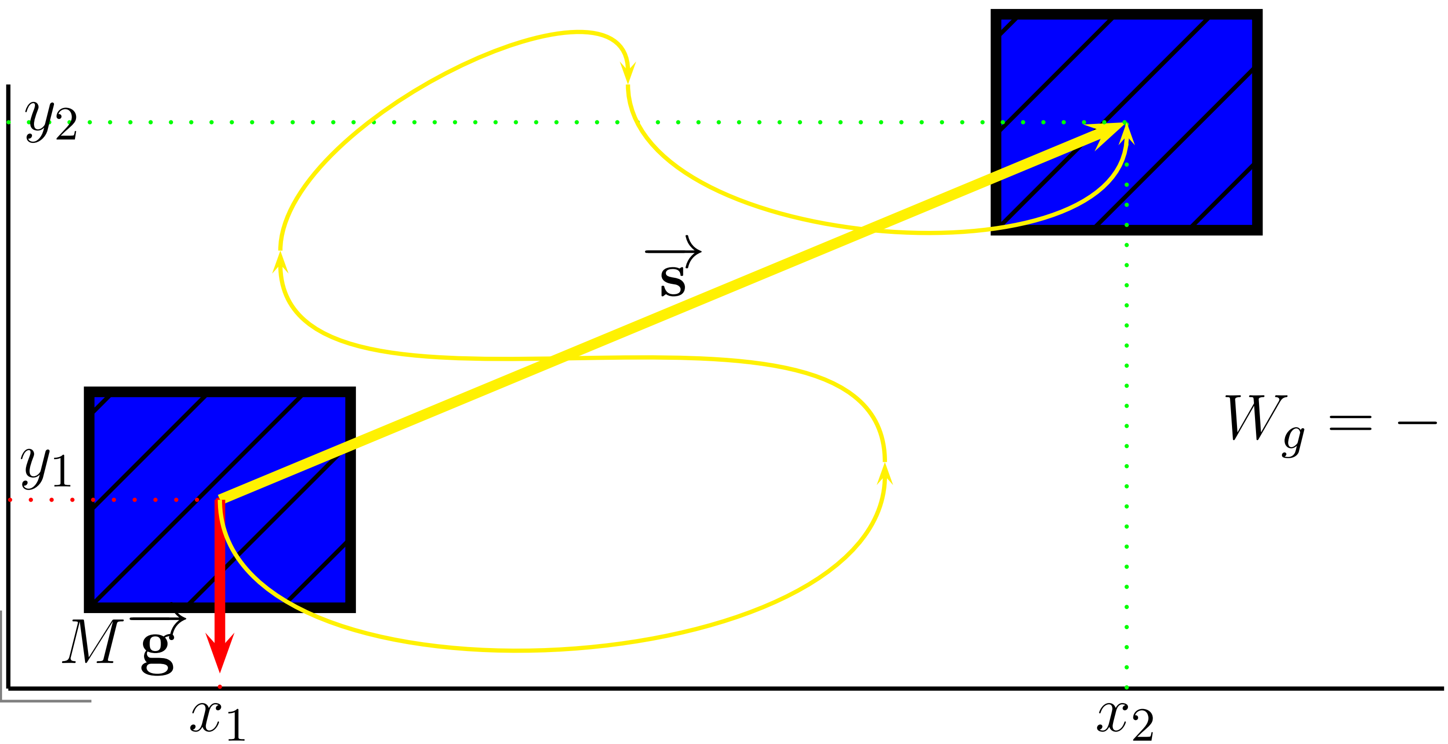

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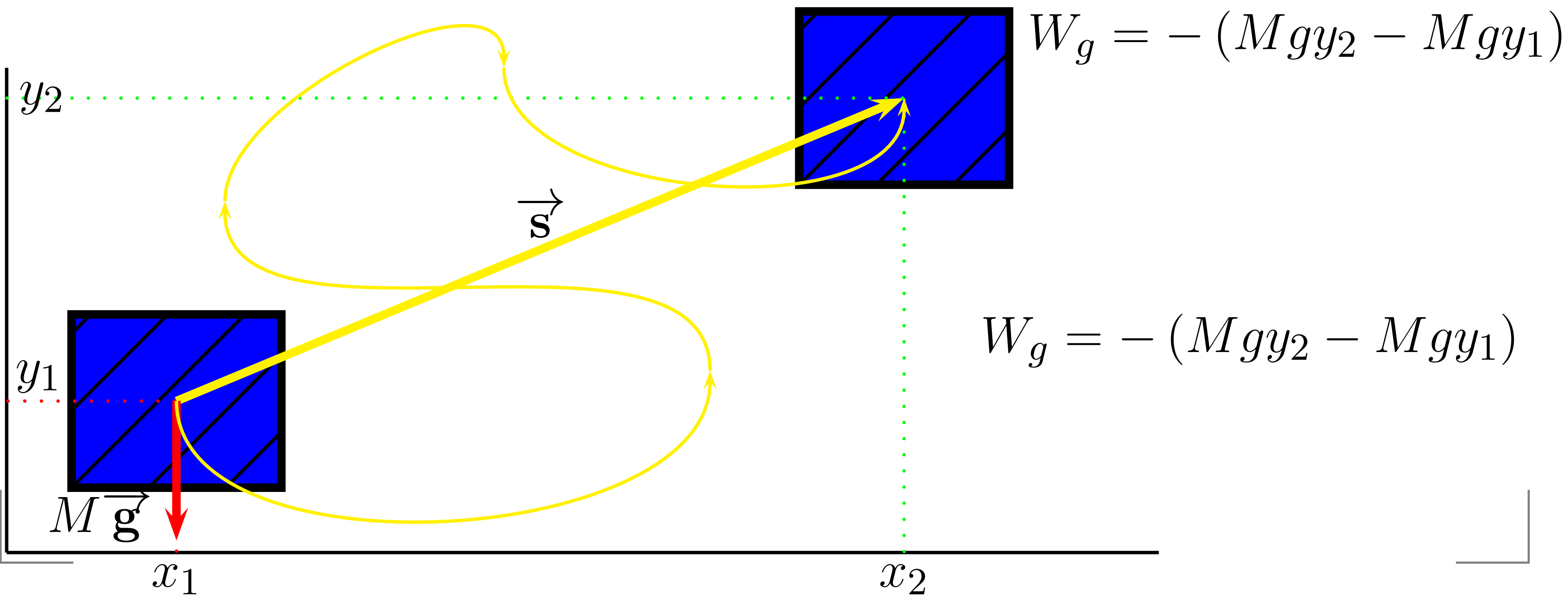

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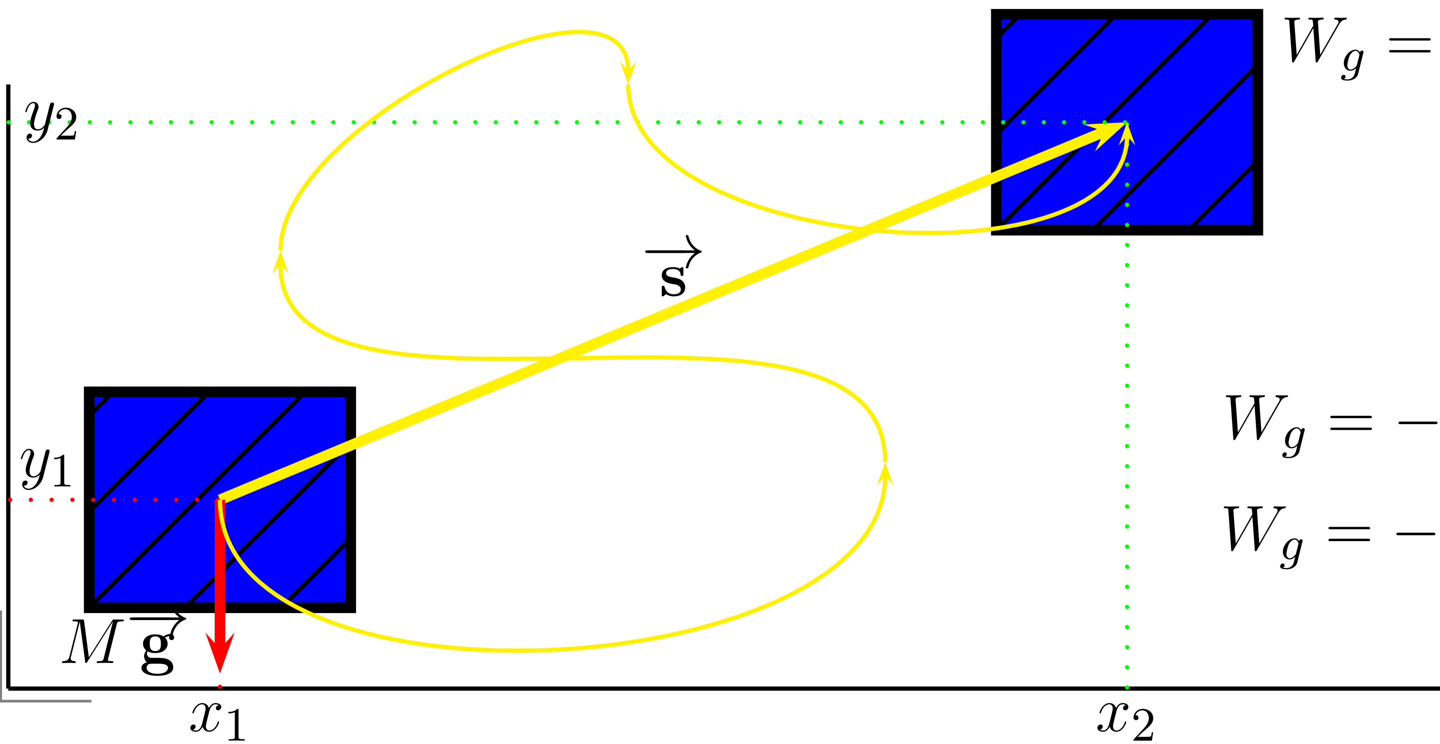

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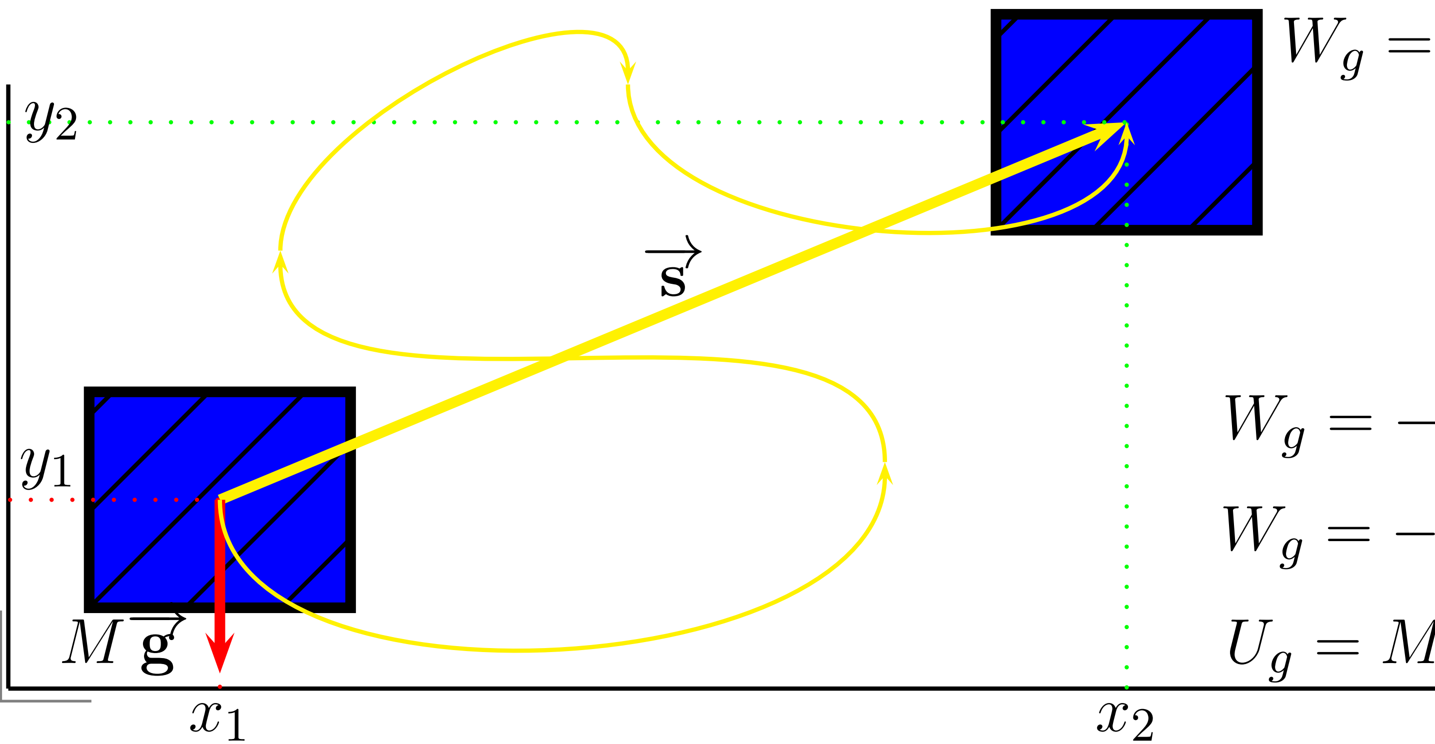

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Example: A mass is started from rest at the top of a frictionless slide of height h, how fast is it going at the bottom?

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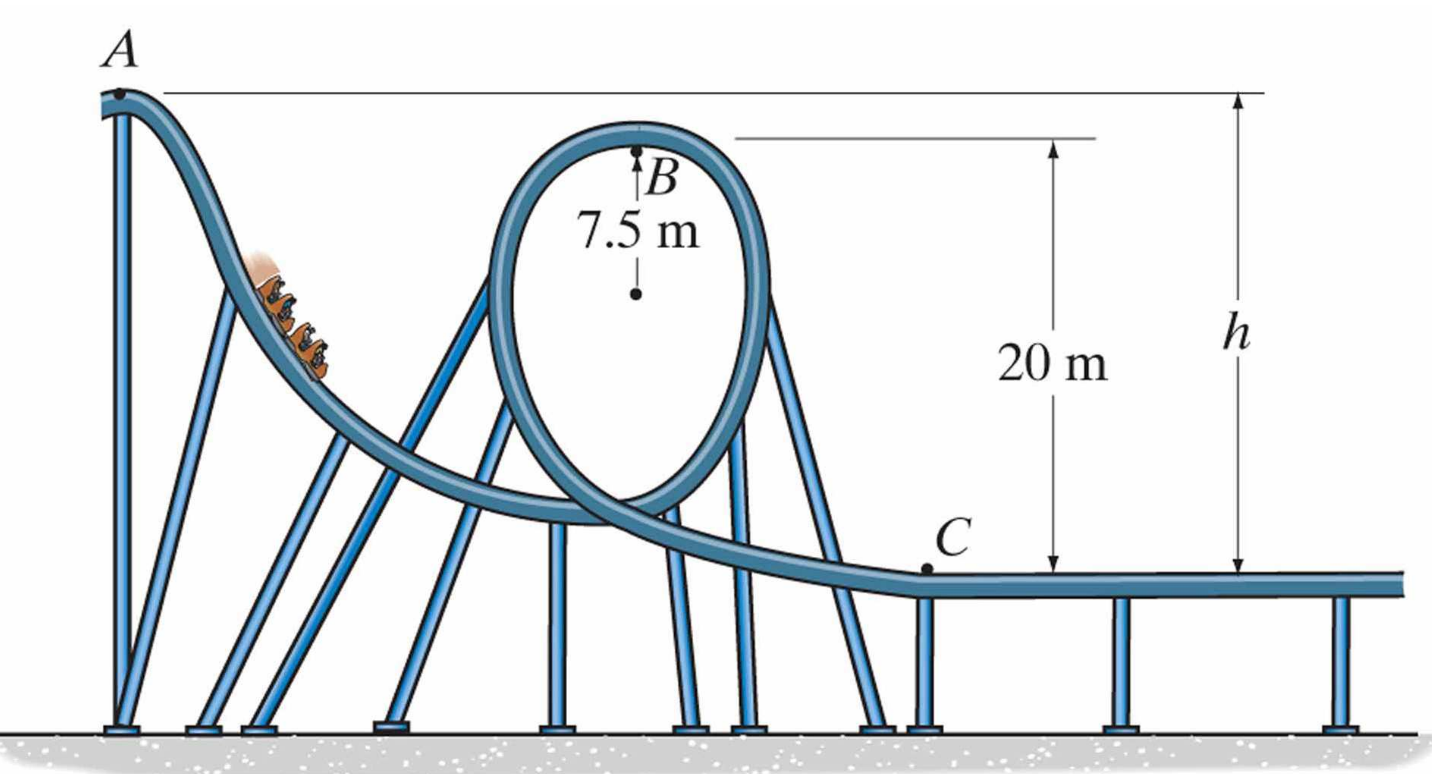
Clicker Quiz

A roller coaster starts from rest at point A, goes through the loop-to-loop, and arrives at point C. If friction can be ignored and the roller coaster simply slides along its track, how fast will the roller coaster be going at C?



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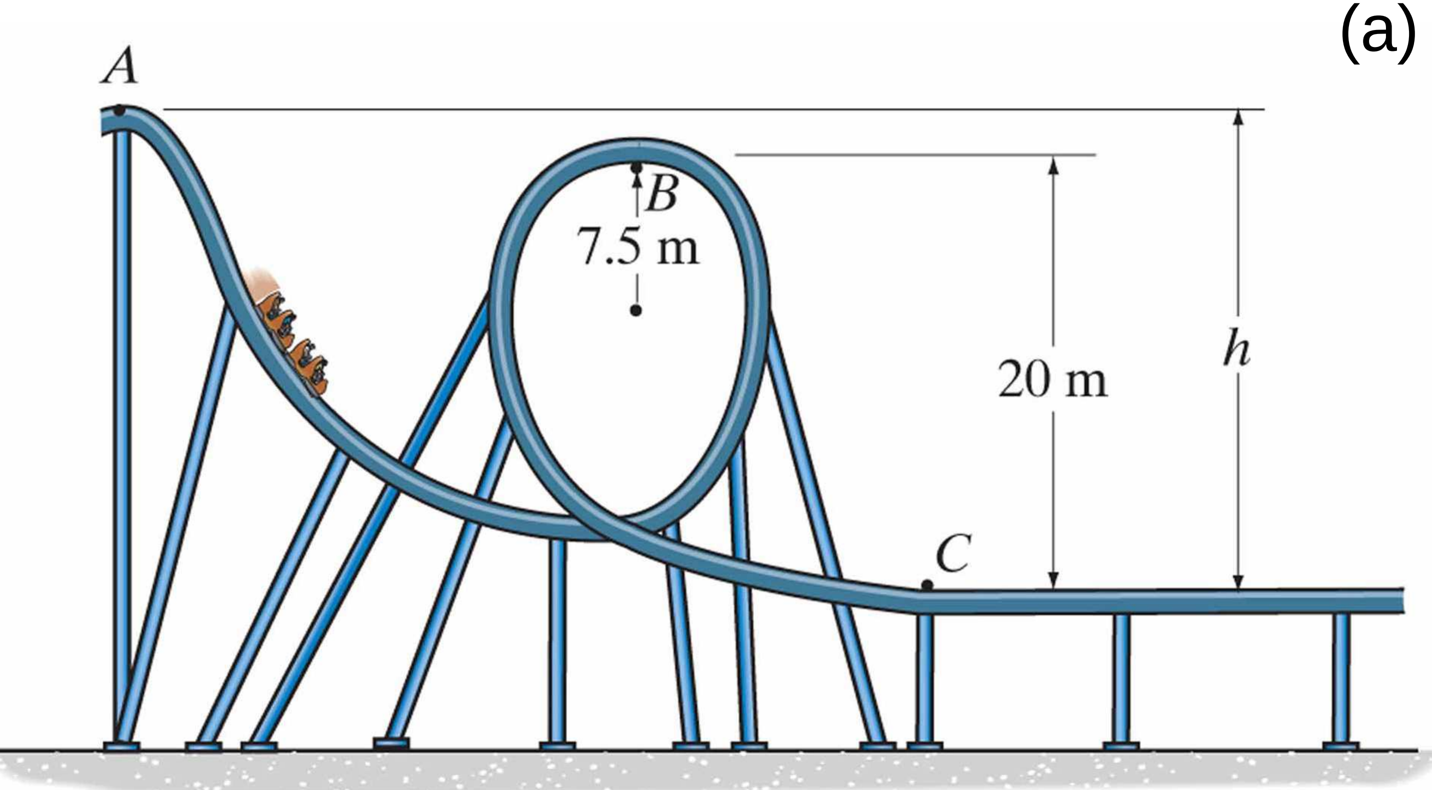

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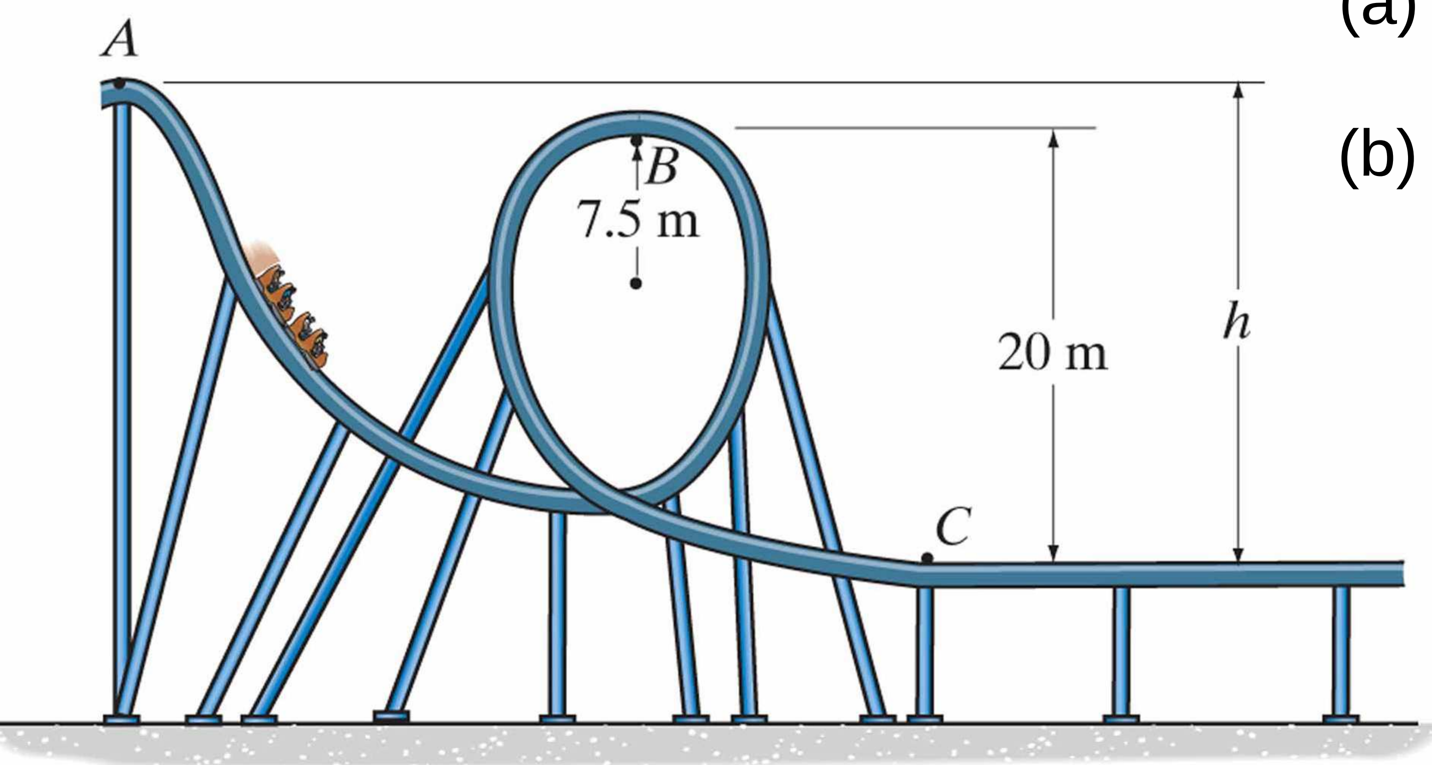

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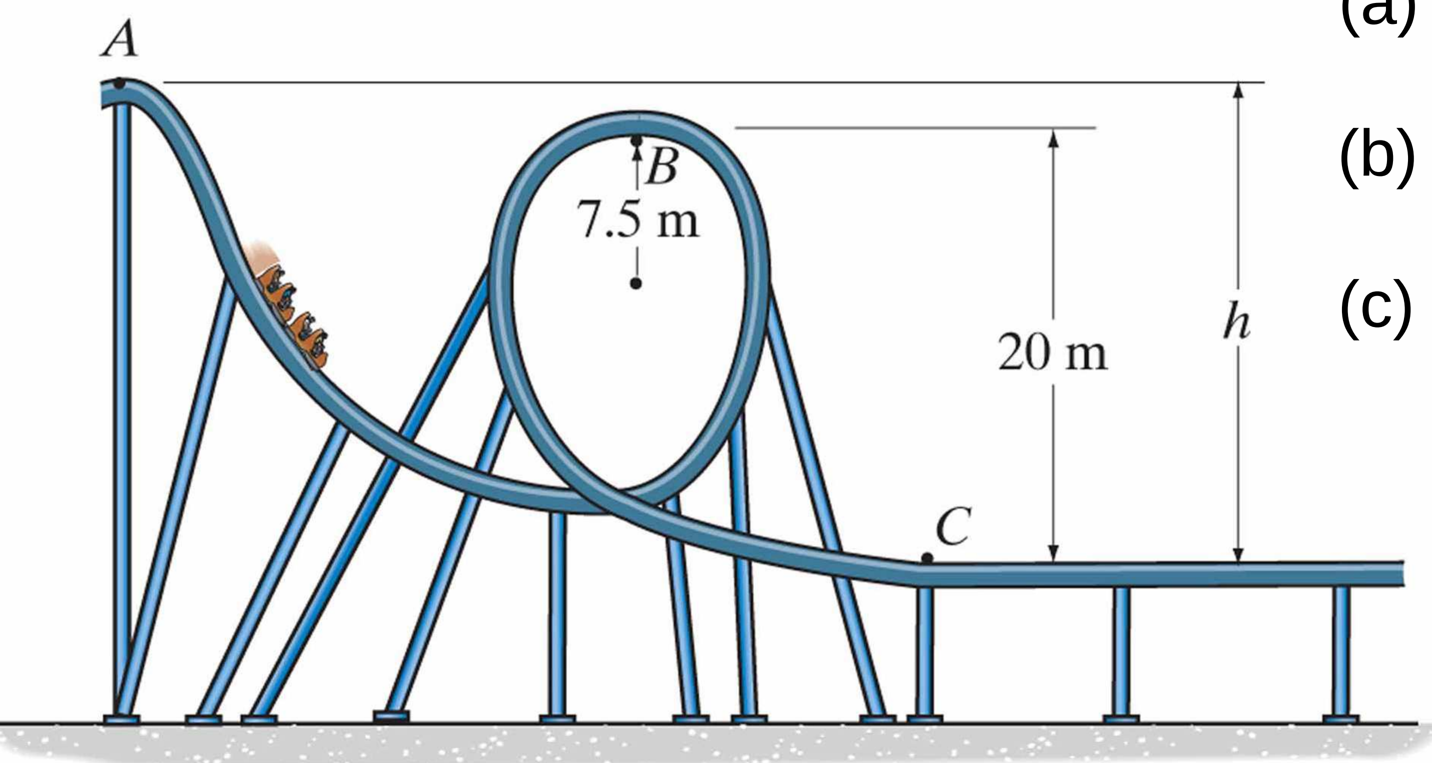

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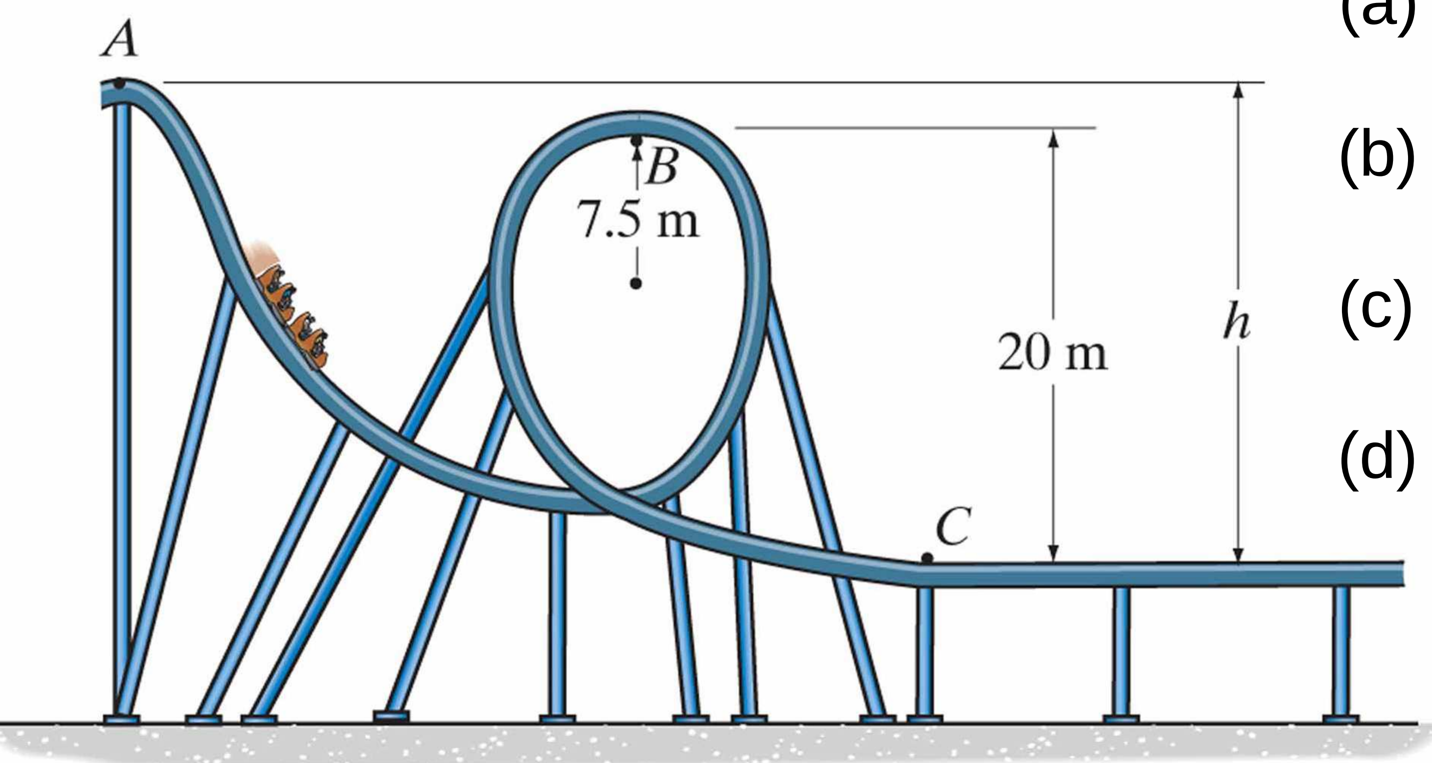

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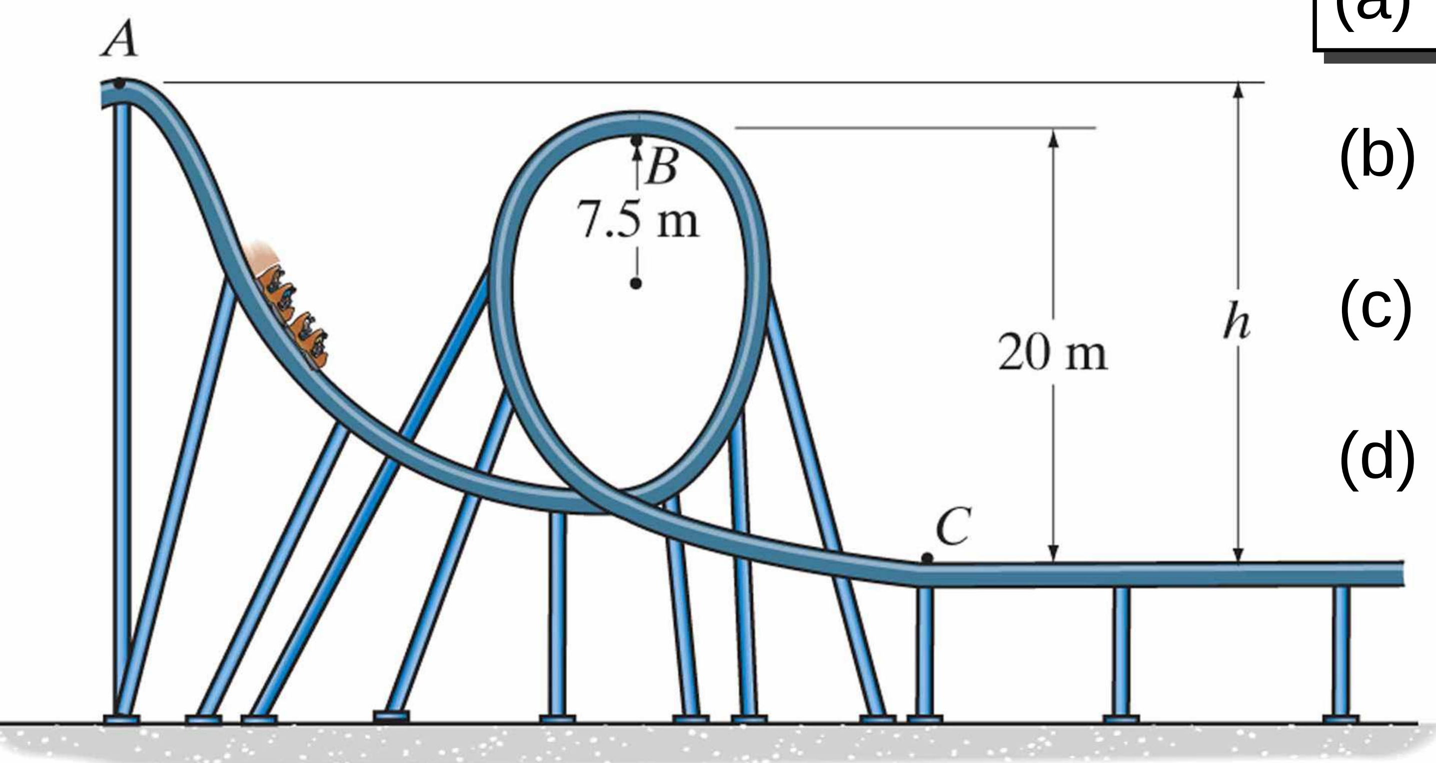

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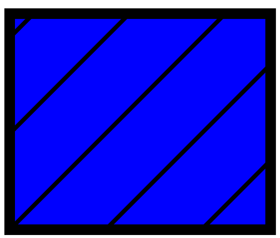

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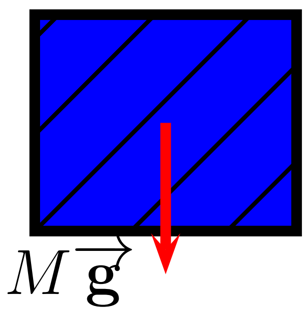

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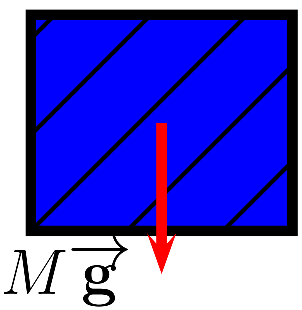

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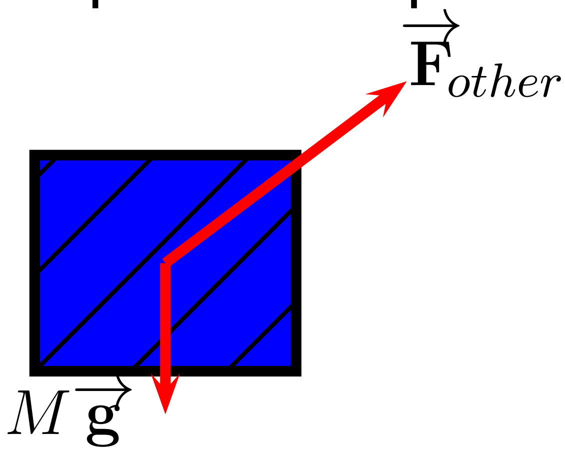

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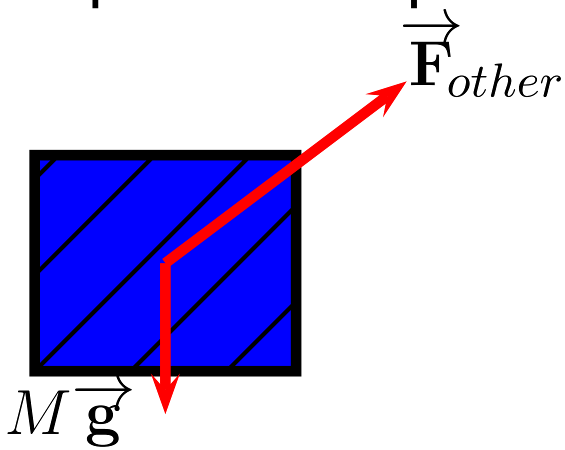

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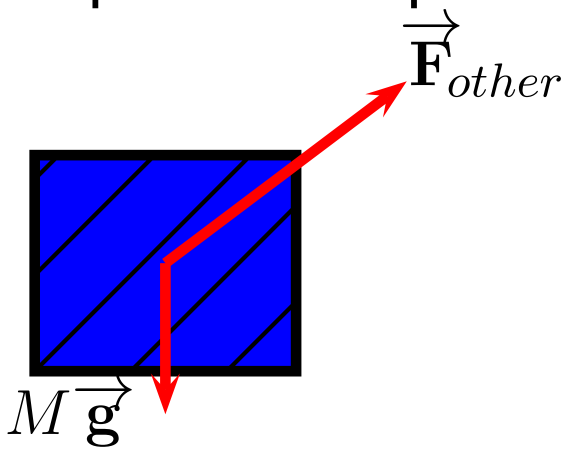

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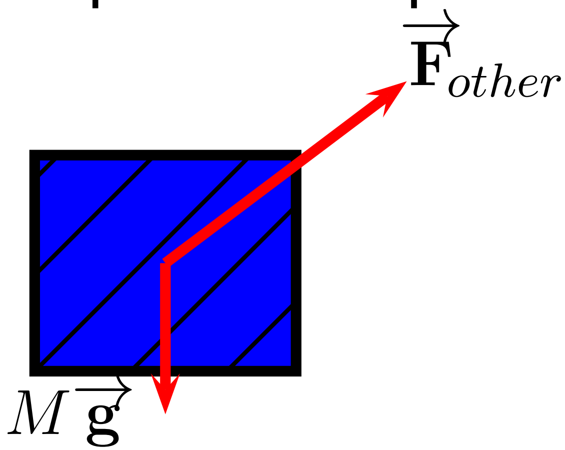

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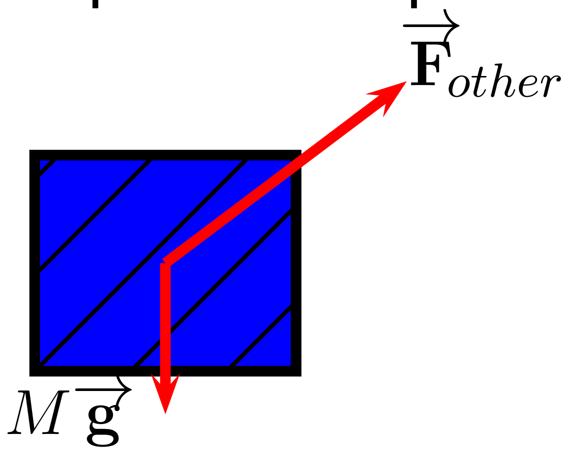

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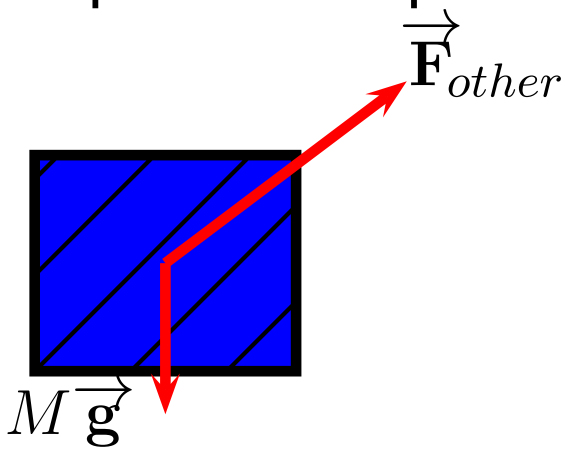

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$$-\left(Mgy_1 - Mgy_2\right) + W_{other} = \frac{1}{2}Mv_2^2 - \frac{1}{2}Mv_1^2$$

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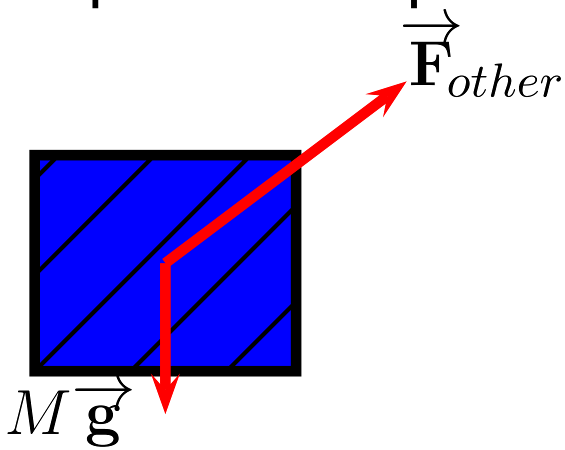

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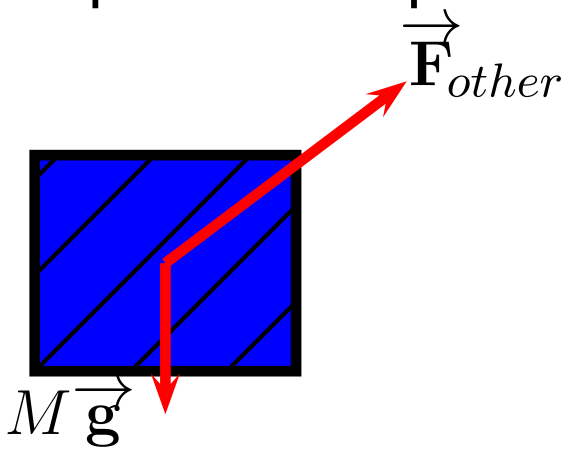

$$\boxed{\frac{1}{2}Mv_1^2 + Mgy_1 + W_{other} = \frac{1}{2}Mv_2^2 + Mgy_2}$$

<u>Example:</u> A mass slides down a $23°$, 2-m long incline. If it starts with speed $5\,m/s$ and $\mu_k = 0.6$, what is its speed at the bottom?