February 20, Week 6

Today: Chapter 5, Applying Newton's Laws

Homework #4, Due tonight.
Mastering Physics: 9 problems from chapters 1 and 3
Written Question: 3.56

Exam #2, Next Friday, February 24
Review Session, Thursday, February 23, 7:30PM
Chapter 3 review questions on Mastering Physics.

Applying Newton's Laws

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$\overrightarrow{\mathbf{a}} \neq 0$ are called dynamic or kinetics problems

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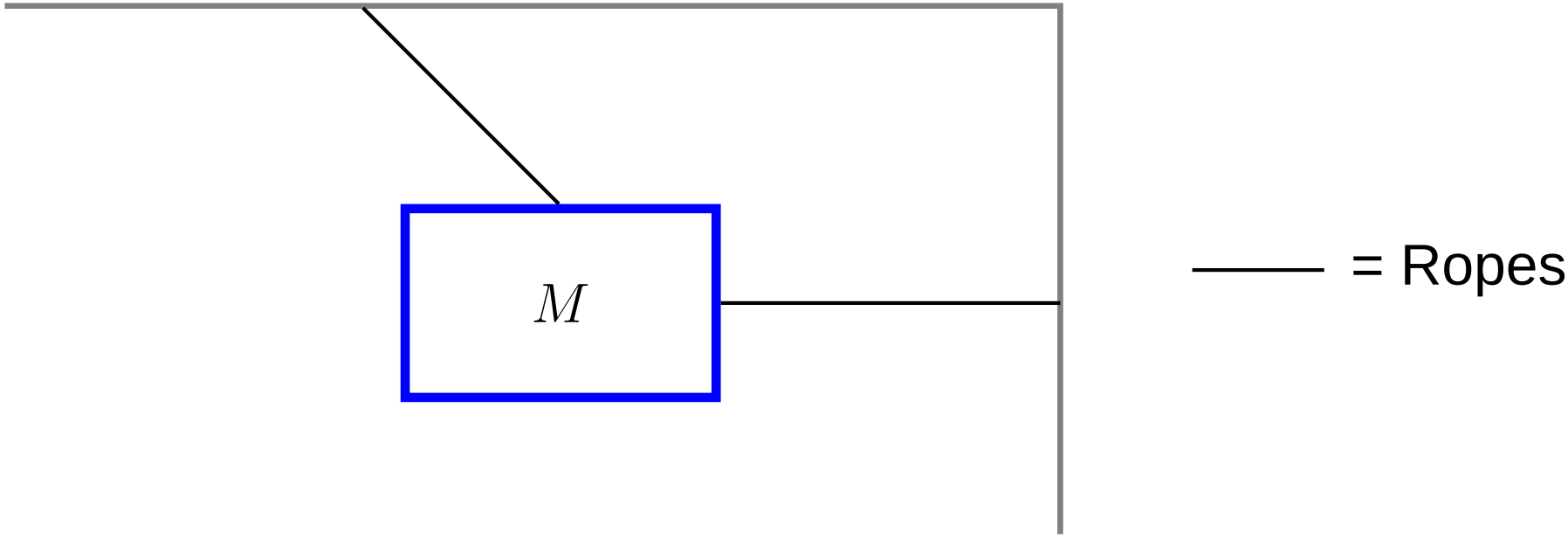

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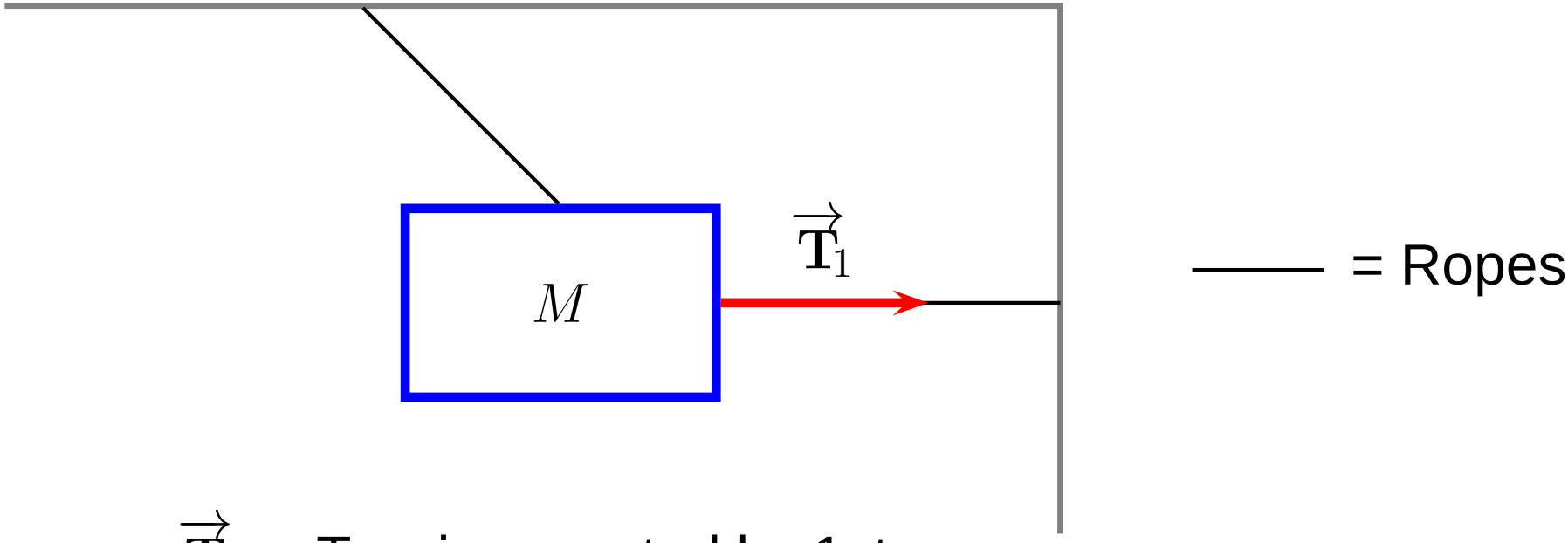

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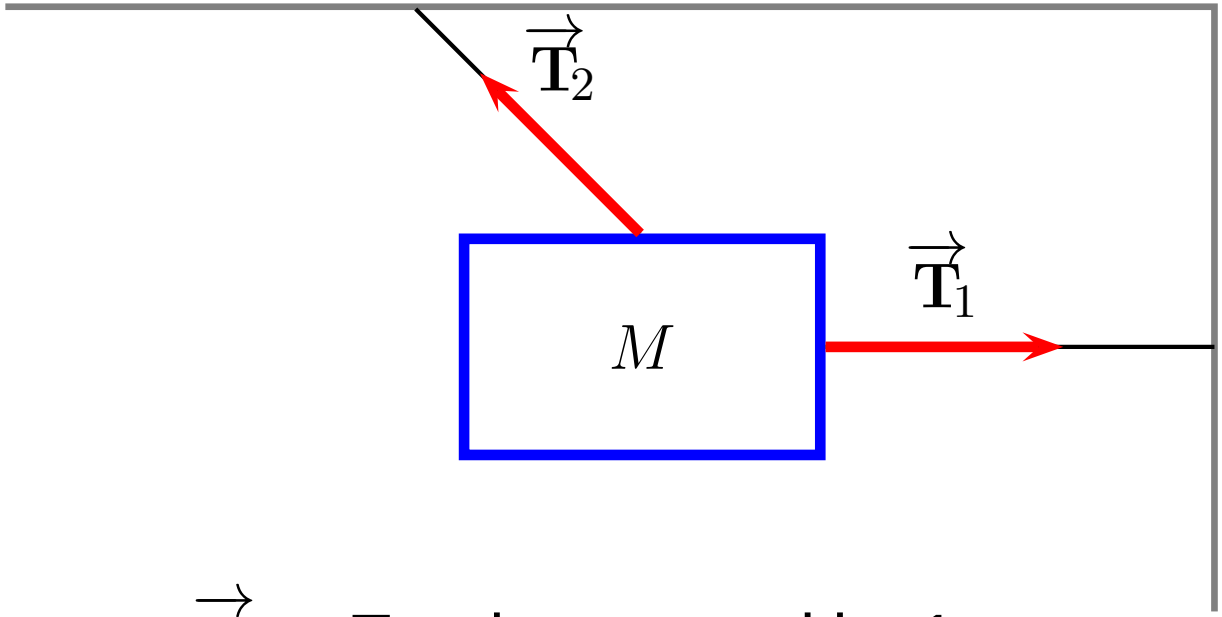

—— = Ropes

$\vec{\mathbf{T}}_1 =$ Tension exerted by 1st rope

$\vec{\mathbf{T}}_2 =$ Tension exerted by 2nd rope

Steps

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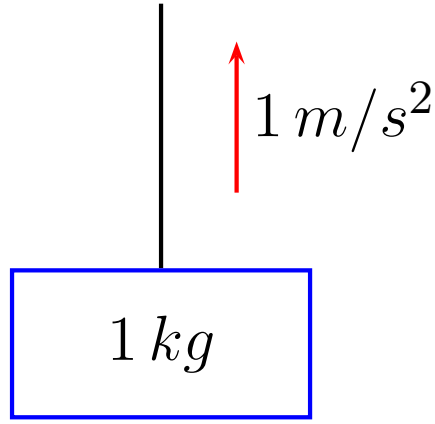
- Solve for unknowns.

Clicker Quiz

A $1\,kg$ mass is accelerated upwards at $1\,m/s^2$ by pulling on a massless rope. What is the tension in the rope?



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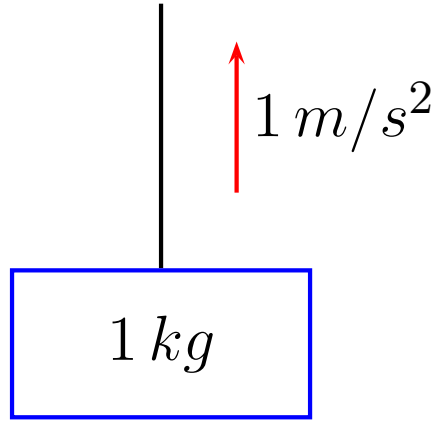

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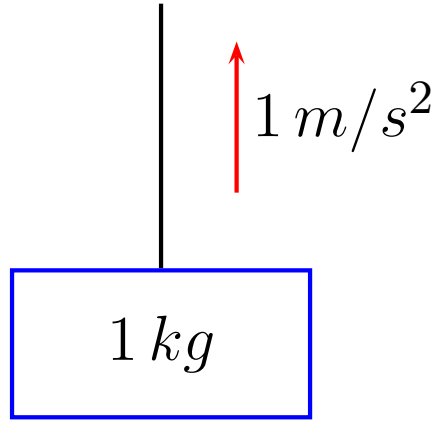

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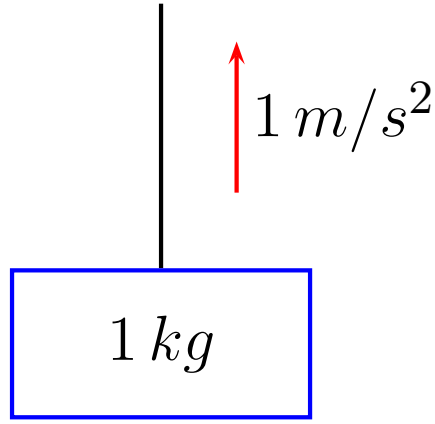

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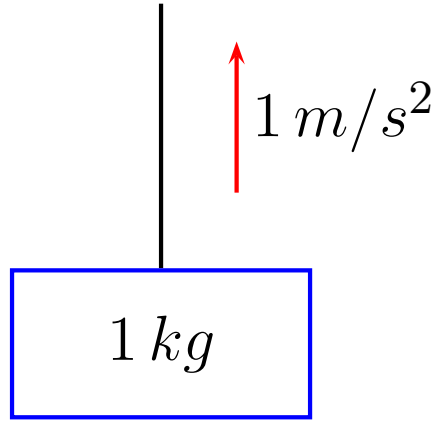

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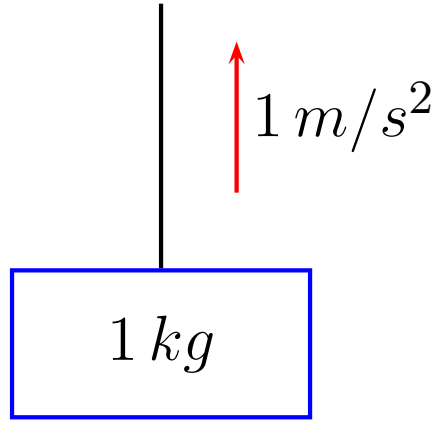

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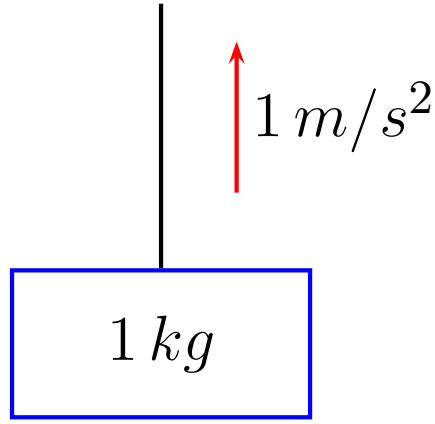

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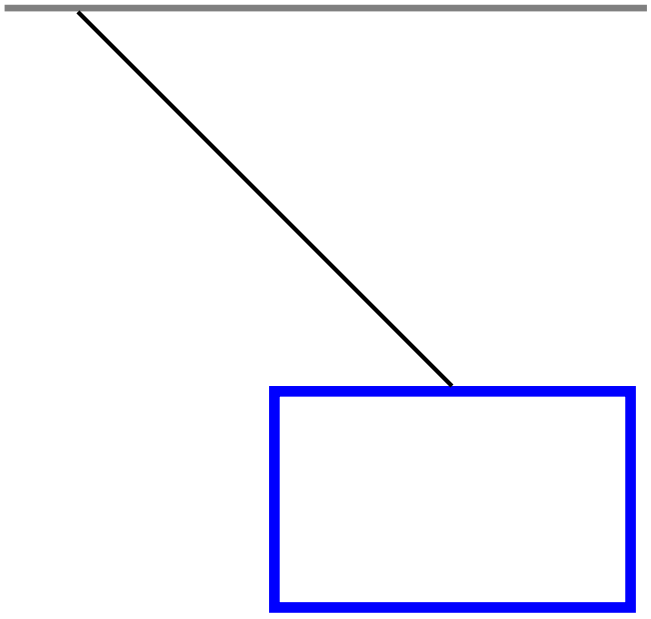

First think of the forces exerted **by** the rope

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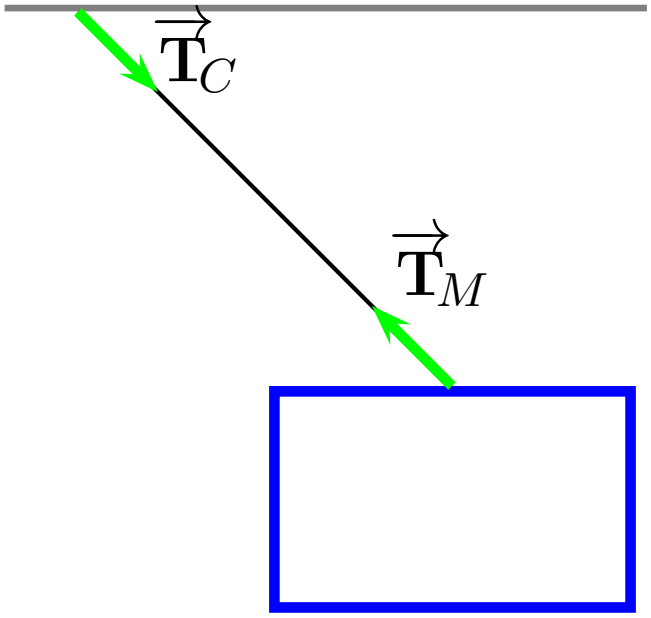

$\overrightarrow{\mathbf{T}}_M =$ force on mass due to bottom of rope

$\overrightarrow{\mathbf{T}}_C =$ force on ceiling due to top of rope

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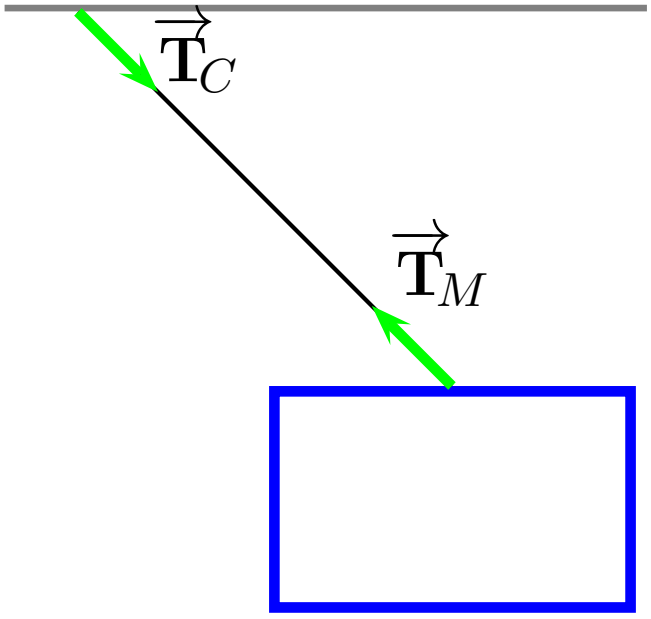

This one time only!

Look at forces **on** the rope

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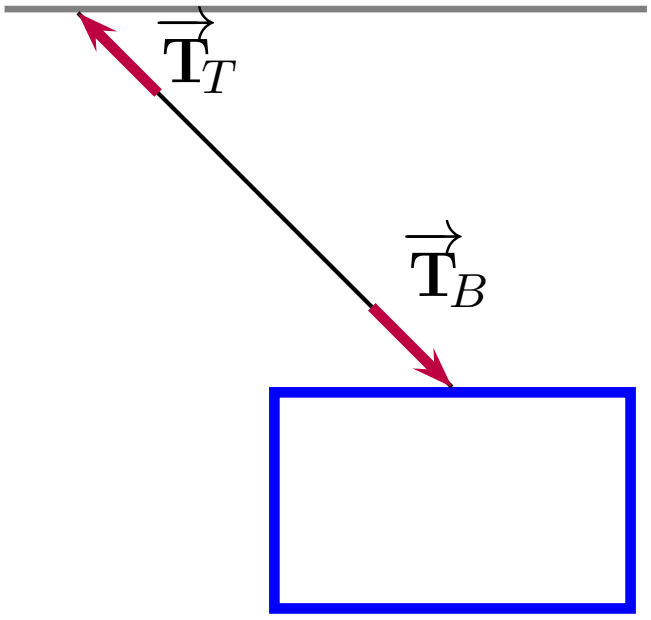

3^{rd} Law $\Rightarrow$

$\overrightarrow{\mathbf{T}}_T =$ force on rope due to the ceiling = tension at top

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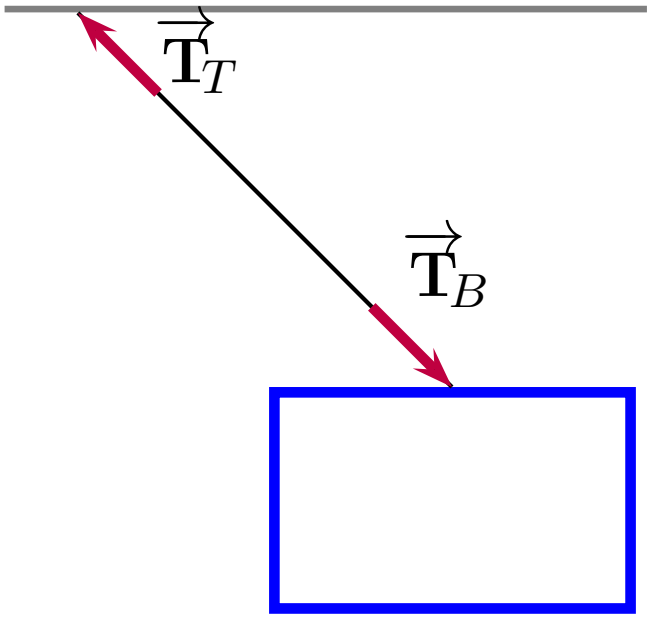

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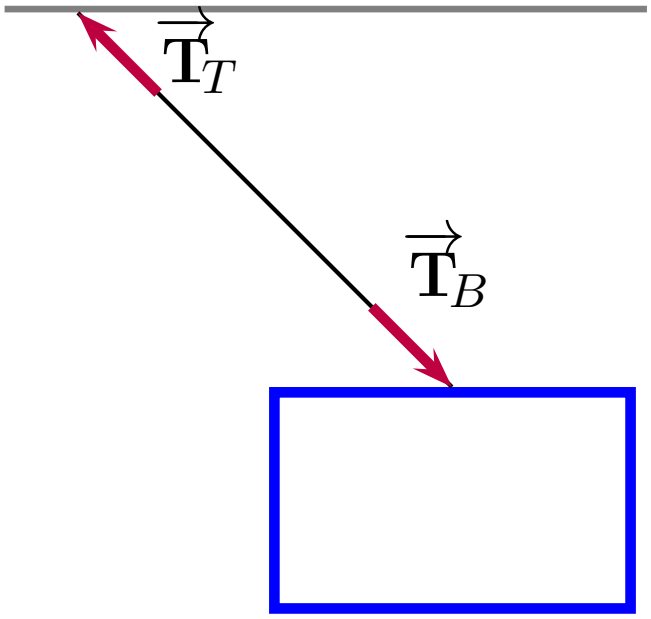

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The magnitude of the tension at the top and bottom of a massless rope is always the same.