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Question 1: Automobile Air Conditioning; Question 2: Falling Leaves

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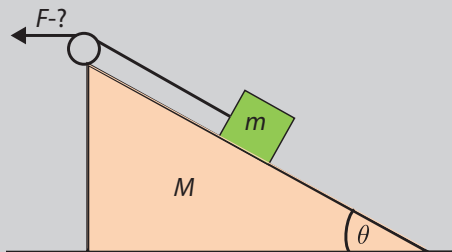
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Physics Challenge for Teachers and Students

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▶ Another wedge issue

A block of mass m is placed on an inclined plane of mass M and angle θ that can slide along the horizontal floor. The string attached to the block is being pulled by a constant horizontal force as shown. What is the magnitude of the pulling force if the block does not slide relative to the inclined plane? Neglect frictional forces.



Guidelines for contributors

- We ask that all solutions, preferably in Word format, be submitted to the dedicated email address challenges@aapt.org. Each message will receive an automatic acknowledgment.

- If your name is—for instance—Joe Scarborough, please name the file “**Scarborough18Oct**” (do not include your first initial) when submitting the October 2018 solution.
- The subject line of each message should be the same as the name of the solution file.
- The deadline for submitting the solutions is the last day of the corresponding month.
- Each month, a representative selection of the successful solvers’ names will be published in print and on the web.
- If you have a message for the Column Editor, you may contact him at korsunbo@post.harvard.edu; however, please do not send your solutions to this address.

Many thanks to all contributors and we hope to hear from many more of you in the future!

Note: as always, we would very much appreciate reader-contributed original Challenges.

Boris Korsunsky, Column Editor

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Fermi Questions

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▶ Question 1: Automobile air conditioning

How much does it cost to air condition all American automobiles for a year? (*Thanks to Alex Godunov of Old Dominion University for suggesting the question.*)

▶ Question 2: Falling leaves

How many leaves will fall in the United States this fall?

Look for the answers online at tpt.aapt.org

Question suggestions are always welcome!

For more Fermi questions and answers, see *Guesstimation 2.0: Solving Today's Problems on the Back of a Napkin*, by Lawrence Weinstein (Princeton University Press, 2012).

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