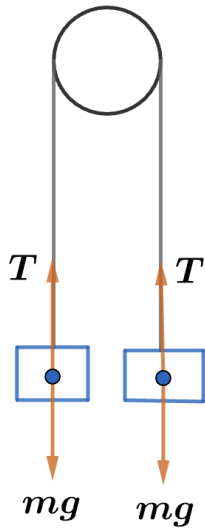


2024 F=ma Exam: Problem 13

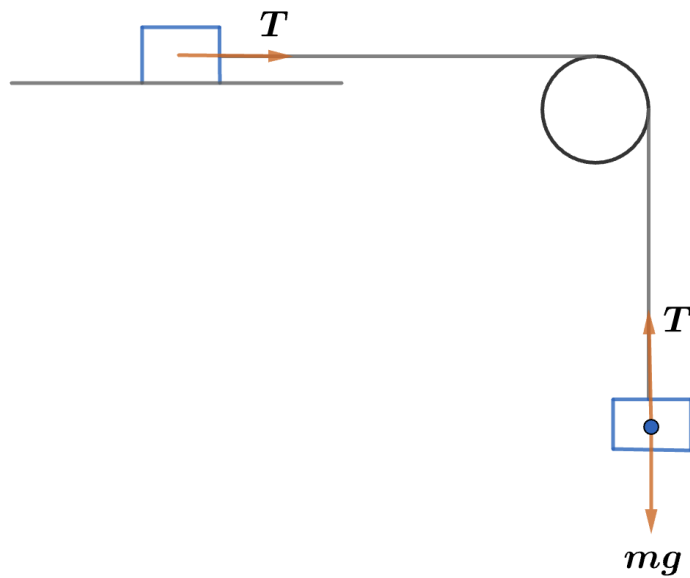
Kevin S. Huang



In the limiting case $x \rightarrow 0$, the setup reduces to a standard Atwood machine with two equal masses so

$$T(x \rightarrow 0) = mg$$

In the limiting case $x \rightarrow \infty$, the setup reduces to the system shown below:



The weight of one block accelerates both,

$$mg = 2ma$$

$$a = \frac{g}{2}$$

Then the tension $T = ma$ (looking at the top block) so

$$T(x \rightarrow \infty) = \frac{mg}{2}$$

Thus, the answer is B.