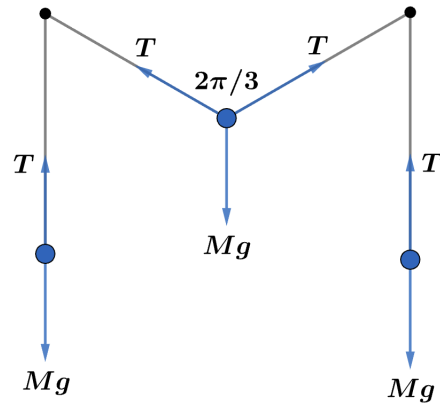


# 2010 F=ma Exam: Problem 11

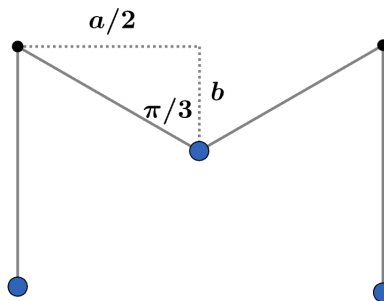
Kevin S. Huang



Since the left and right mass are at rest, we have

$$T = Mg$$

Then we have 3 forces of equal magnitude acting on the middle mass. Since it is also at rest, this means the forces are equally spaced by angle. Thus, the angle between the two ropes is  $2\pi/3$ .



Relating the angle to  $a$  and  $b$ , we have

$$\begin{aligned}\tan \frac{\pi}{3} &= \frac{a/2}{b} \\ \sqrt{3} &= \frac{a}{2b} \\ \frac{a}{b} &= 2\sqrt{3}\end{aligned}$$

so the answer is E.