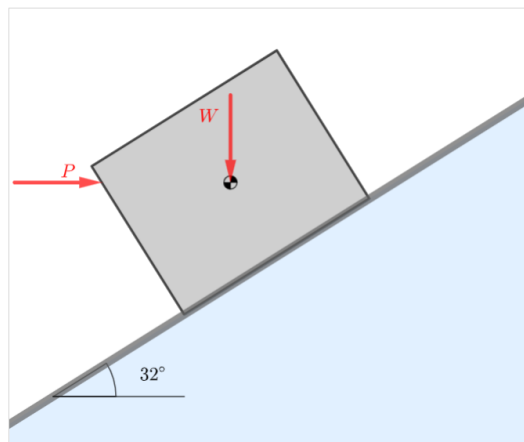


Unless otherwise mentioned, these problems should be solvable using a basic calculator. Practice clear communication by showing all work (free body diagrams, algebra, etc). This will be required to receive full credit on any graded problems.

1. A 360 lbs horizontal force P is applied to a 180 lbs box resting on an 32° incline. The line of action of P passes through the center of gravity of the box. The box is 5 ft wide \times 4 ft tall, and the coefficients of friction between the box and the surface are $\mu_s = 0.1$ and $\mu_k = 0.080$.
 - (a) Determine the magnitude of the friction force acting on the box.
 - (b) Is the box:
 - In Equilibrium
 - Sliding up the incline
 - Sliding down the incline
 - Tipping



2. Professor Seiler is trying his hand at rappelling. He has chosen a cliff (AOB) which is inclined to the vertical as shown in the figure. It is known that $\theta = 80$ degrees and $\beta = 65$ degrees. It is also known that Professor Seiler weighs 750 N. His CG is located at 162 cm from his feet and he is holding the rope with his hands which are at a distance of 180 cm from his feet as shown on the right. Let the coefficient of friction between his feet and the cliff wall be μ_s .

Find:

- Tension in the rope.
- The minimum value of μ_s so that he does not slip and remains in equilibrium.

