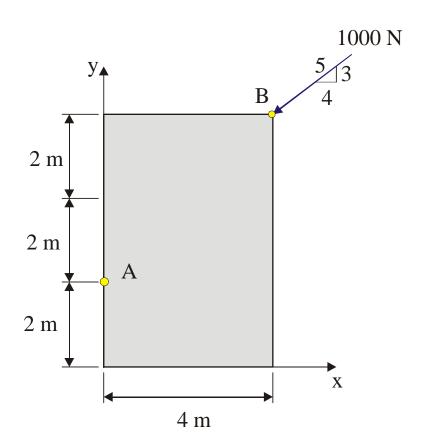
Example 3.1

J. Frye

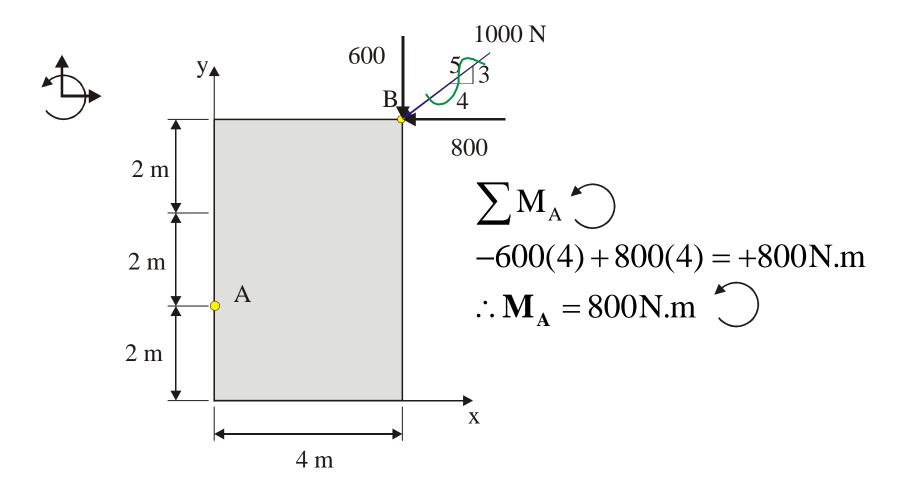
Example 3.1:

Consider the 4 m×6 m block with a 1000 N force applied at point B as shown.

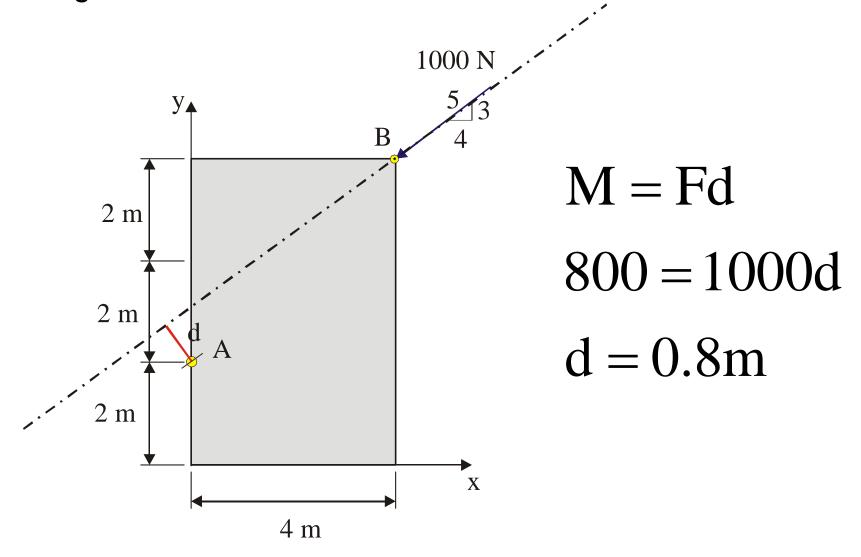
- (a)Determine the moment of the 1000 N force applied at B about the point A by resolving the force along horizontal and vertical directions.
- (b) The perpendicular distance from the line of action of the 1000 N force to the point A.
- (c)Smallest force at B, which creates the same moment at A as in part (a).



a) Resolve all forces into rectangular components and then take moments:



b) The perpendicular distance from the line of action of the 1000 N force to the point A is found by equating the magnitude of the moment, M to Fd.



Since M = Fd or F = M/d

F gets smaller as d increases

The minimum value of F occurs when the perpendicular distance, d from the line of action of the force to the point we are taking moment about is the <u>largest distance</u>.

In this problem since we have taken moments about Point A we identify point B as the point on the block that is furthest from point A.

We draw a line connecting point A and point B. The force F is therefore placed perpendicular to this line. The "sense" of F depends on whether the moment M is a clockwise or counter-clockwise moment

In our case, the moment in Part A of the question is positive (counter-clockwise). We therefore indicate the "sense" of F such as to produce a counter-clockwise moment about A

c) The smallest force F that will create the 800N.m counter-clockwise moment about point A.

