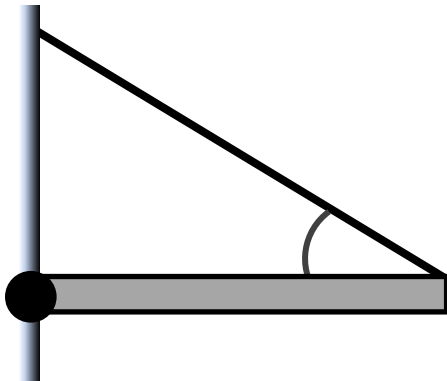## BEAM / SHELF AGAINST A WALL

● Some Static Equilibrium problems have shelf-like objects tensioned against a <u>wall</u>   →

    - In these problems, the <u>hinge</u> (on the wall) applies a force against the beam**.**

    - The hinge <u>always</u> applies a <u>horizontal</u> force against the _____**.**

    - The hinge <u>almost always</u> applies a force _____ on the beam**,** to help hold it**.**

        - We'll assume H_Y is _____**,** and if you get a negative for H_Y, it means it was actually down **–** which is OK!
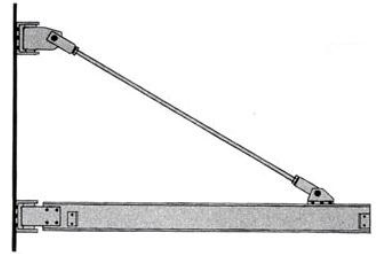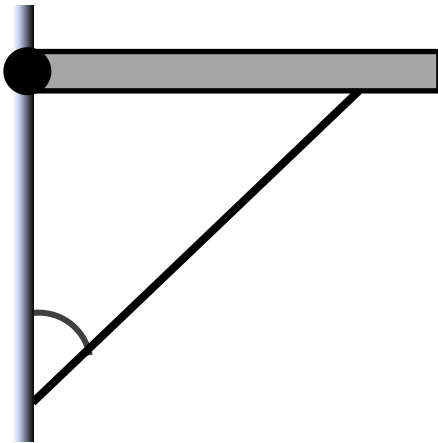
<u>EXAMPLE</u>**:** A beam 300 kg in mass and 4 m in length is held horizontally against a vertical wall by a hinge on the wall and a light cable, as shown. The cable makes an angle of 37° with the horizontal. Calculate the**:**
    (a) Magnitude of the Tension force on the cable**;**
    (b) Magnitude and direction of the Net Force the hinge applies on the beam**.**

PRACTICE: BEAM SUPPORTED BY AN INCLINED ROD

PRACTICE: A beam 200 kg in mass and 6 m in length is held horizontally against a wall by a hinge on the wall and a light rod underneath it, as shown. The rod makes an angle of 30º with the wall and connects with the beam 1 m from its right edge. Calculate the angle that the Net Force of the hinge makes with the horizontal (use +/– for above/below +x axis).

EXAMPLE: BEAM SUPPORTING AN OBJECT

EXAMPLE: A beam 400 kg in mass and 8 m in length is held horizontally against a wall by a hinge on the wall and a light cable, as shown. The cable makes 53º with the horizontal and connects 2 m from the right edge of the beam. A 500 kg object hangs from the right edge of the beam. Calculate the magnitude of the net force the hinge applies on the beam.
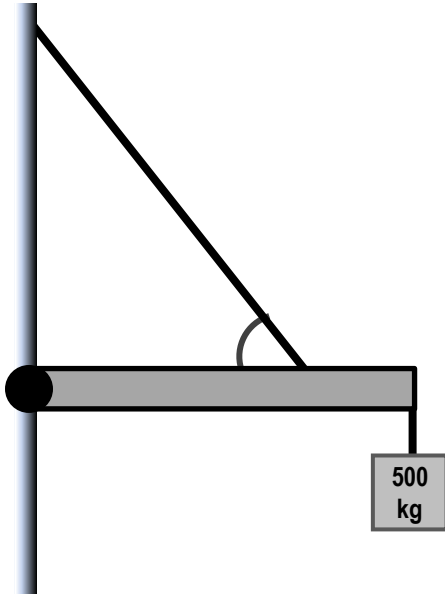
PRACTICE: INCLINED BEAM AGAINST A WALL

PRACTICE: A beam 200 kg in mass and 4 m in length is held against a vertical wall by a hinge on the wall and a light horizontal cable, as shown. The beam makes 53º with the wall. At the end of the beam, a second light cable holds a 100 kg object. Calculate the angle that the Net Force of the hinge makes with the horizontal (use +/– for above/below +x axis).

100
kg