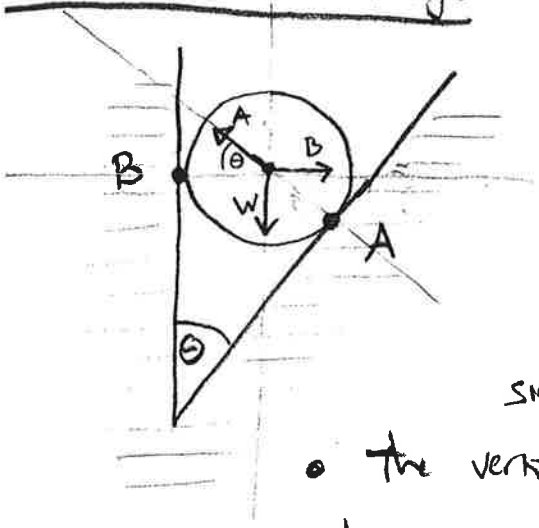
EX 22.2

Ball stuck in a wedge



- Here is a free body diagram depicting the forces acting on the block. By Newton's 2nd law, they must sum to zero, since the block is not accelerating
- the vertical component of A must balance the weight, W. the horizontal component of A must balance B. Namely,

$A\cos\theta = B$ (i)

$A\sin\theta = W$ (ii)

- Dividing (ii) by (i) gives $\tan\theta = \frac{W}{B}$, or $B = \frac{(0.001)(9.8)}{\tan 10^\circ}$

So we find that $\boxed{B = .012\ N}$ and that $\boxed{A = .015\ N}$

- By Newton's 3rd law, these forces are equal and opposite the force which the ball exerts on the wall. So there is a bigger force on wall A than on wall B.
- By the way, the contact points are both at a distance d given by $d = \frac{\text{radius}}{\tan(20^\circ)} = \boxed{1.4\ cm}$ from the vertex
- If $\theta = 15^\circ$ then the force must increase in order to support the weight of the ball.