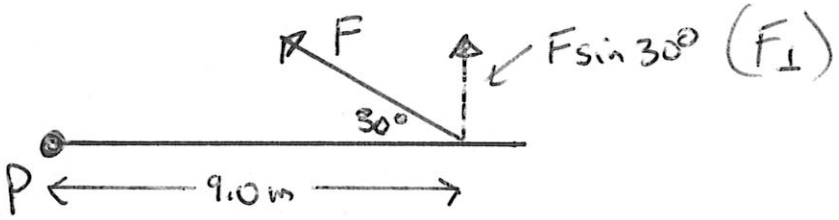
9. Your diagram should consist of the pivit pant (P) and the lever arm. The forces are always applied to the lever arm so label them and label the distance (r) from the force to the pivit point



$\tau = r F_\perp$ ← perpendicular force

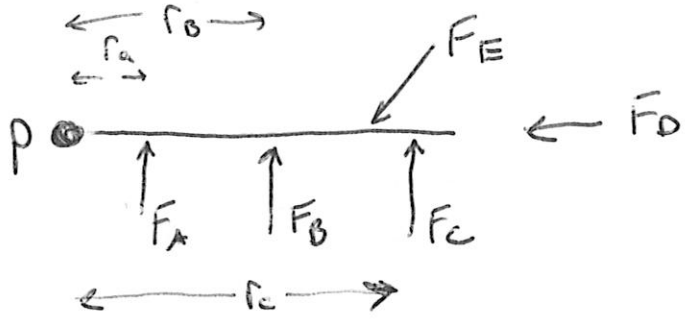
- τ: Symbol for Torque
- r: distance along lever arm from P to $F_\perp$

$$\tau = (9.0)(55 \sin 30^\circ)$$
$$= 247.5 \text{ N·m}$$

Remember Torque is a vector quantity so it needs a direction. The Force (F) will produce a counter-clockwise twisting action on point P

$$\tau = 250 \text{ N·m [CC]}$$

10



We can see from the diagram that F_A, F_B and F_C all produce a counter-clockwise torque on point P. F_E will produce a clockwise torque and F_D produces <u>no torque</u> because $r = 0$ (force passes through P)

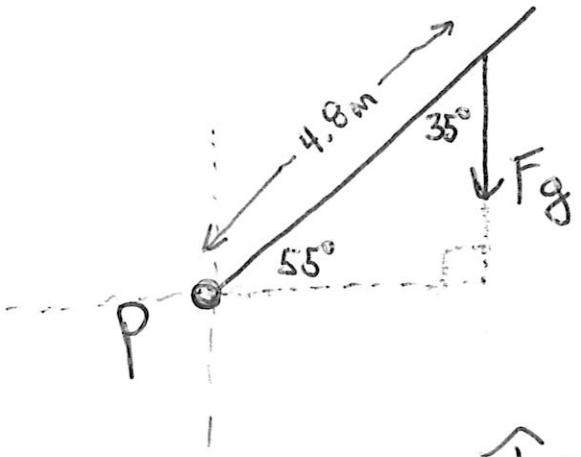
a) <u>F_C</u> produces the greatest torque because r_c is the largest distance

$$\tau = r_c F_c$$

b) <u>F_A</u> since r_a is small F_A would need to be large to produce the required torque

c) F_E

11. This question only wants the torque produced by the firefighter on point P. The weight of the ladder itself would produce a clockwise rotation torque and the normal force (F_N) from the wall would produce a counter-clockwise torque.



$$\curvearrowright = r F_\perp$$

$$= (4.8)(m)(g) \sin 35^\circ$$

$$= 4.8\,(70)(9.8) \sin 35^\circ$$

$$= 1889$$

$\curvearrowright = 1900$ N·m [C]