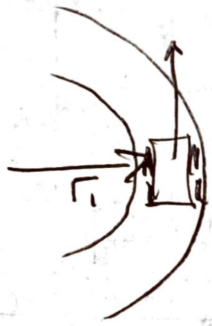
11.36



$v_1 = 220.0\frac{km}{hr} \times \frac{1000 m}{km} \times \frac{1 hr}{3600 s} = \underline{61.11 m/s}$

Car, $m = \underline{750.0 kg}$

$r_1 = 130.0 m$

Turn 1

$v_2 = 180.0 km/hr = 50.00 m/s$

$m = 750.0 kg$

$r_2 = 100.0 m$

$L_1 = r_1 \times m v_1$

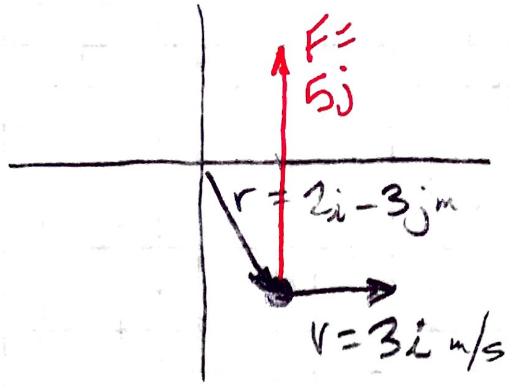
$= (130.0)(750)(61.11)$

$= \boxed{5.958 e6 \, kg\, m^2/s}$

$L_2 = (100.0)(750)(50)$

$= \boxed{3.750 e6 \, kg\, m^2/s}$

11.37 Particle $m = 5.00\,kg$



a) L of particle at this instant:

$L = r \times mv$

$= (2i - 3j) \times (5)(3i)$

$= (3 \cdot 5 \cdot 3)(-j \times i)$

$(+45)(k)$

$= \boxed{+45\,k \ \ kg\,m^2/s}$

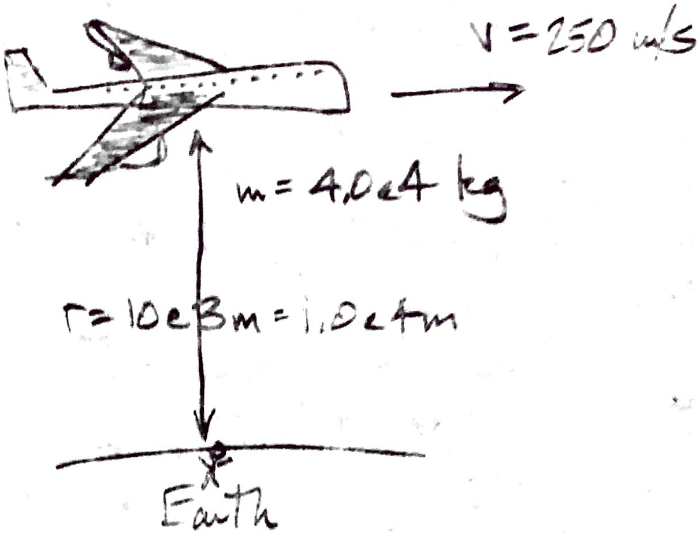
b) Force $F = 5\hat{j}\,N$ at this point, Find torque about origin.

$\tau = \vec{r} \times \vec{F}$

$= (2i - 3j) \times (5j)$

$= \boxed{+10k\,N \cdot m}$

11.41



a) $L = r \times mv$

$= (1e4) \times (4e4)(250)$

$= \boxed{1.0e11 \ kg\,m^2/s}$

b) No, L doesn't change, because $r \sin\theta$ (the vertical component) remains constant.