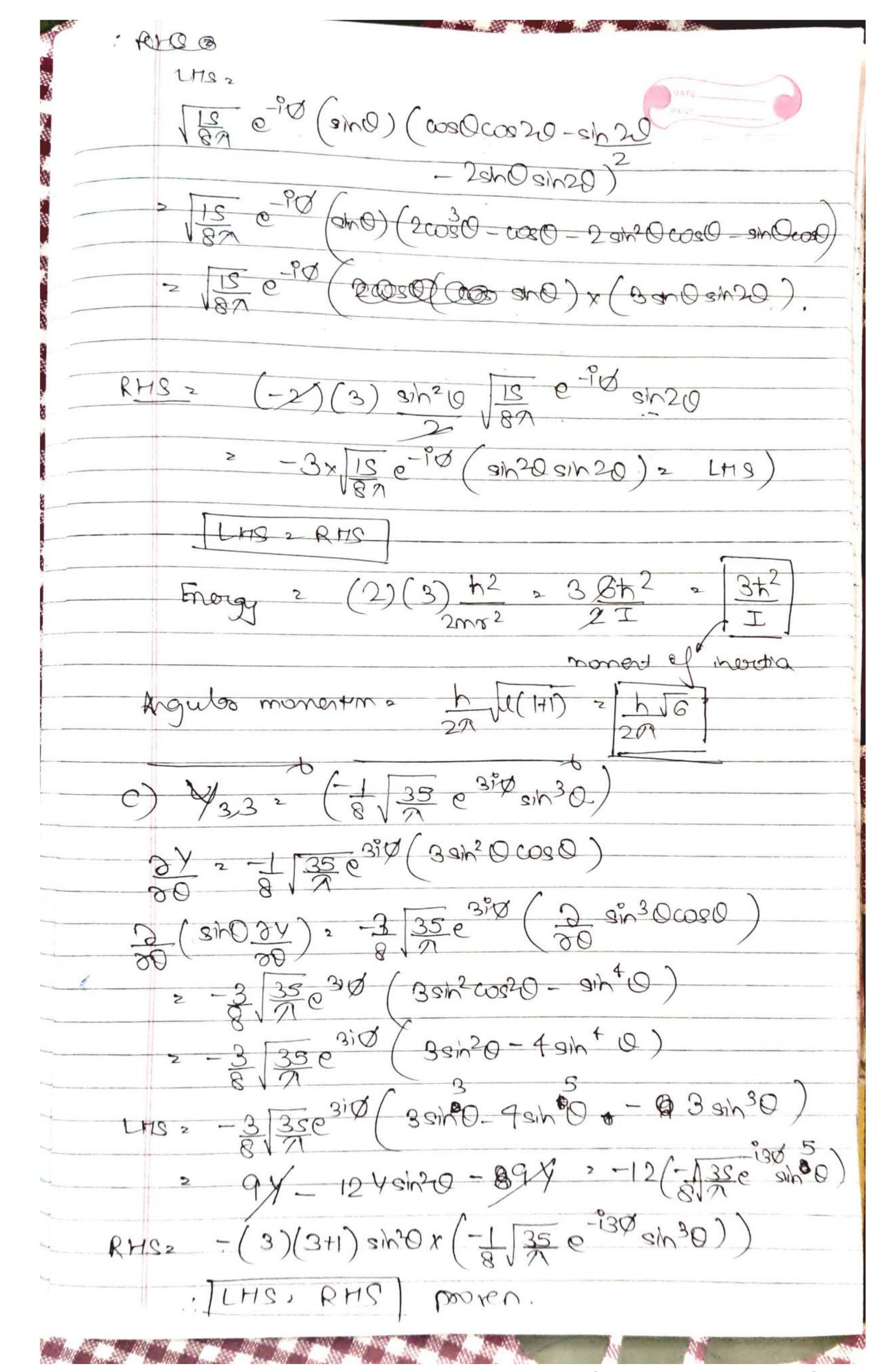
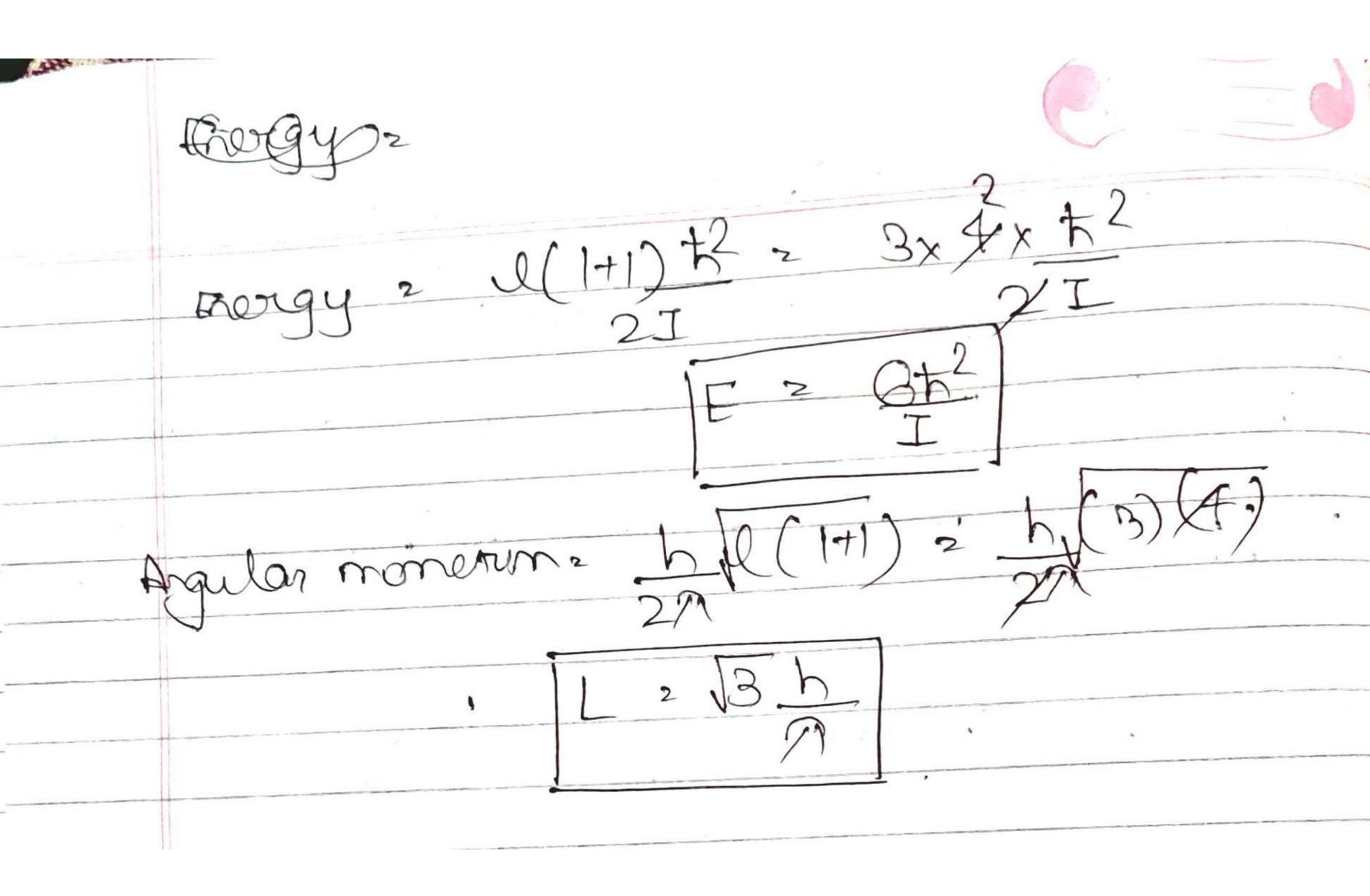
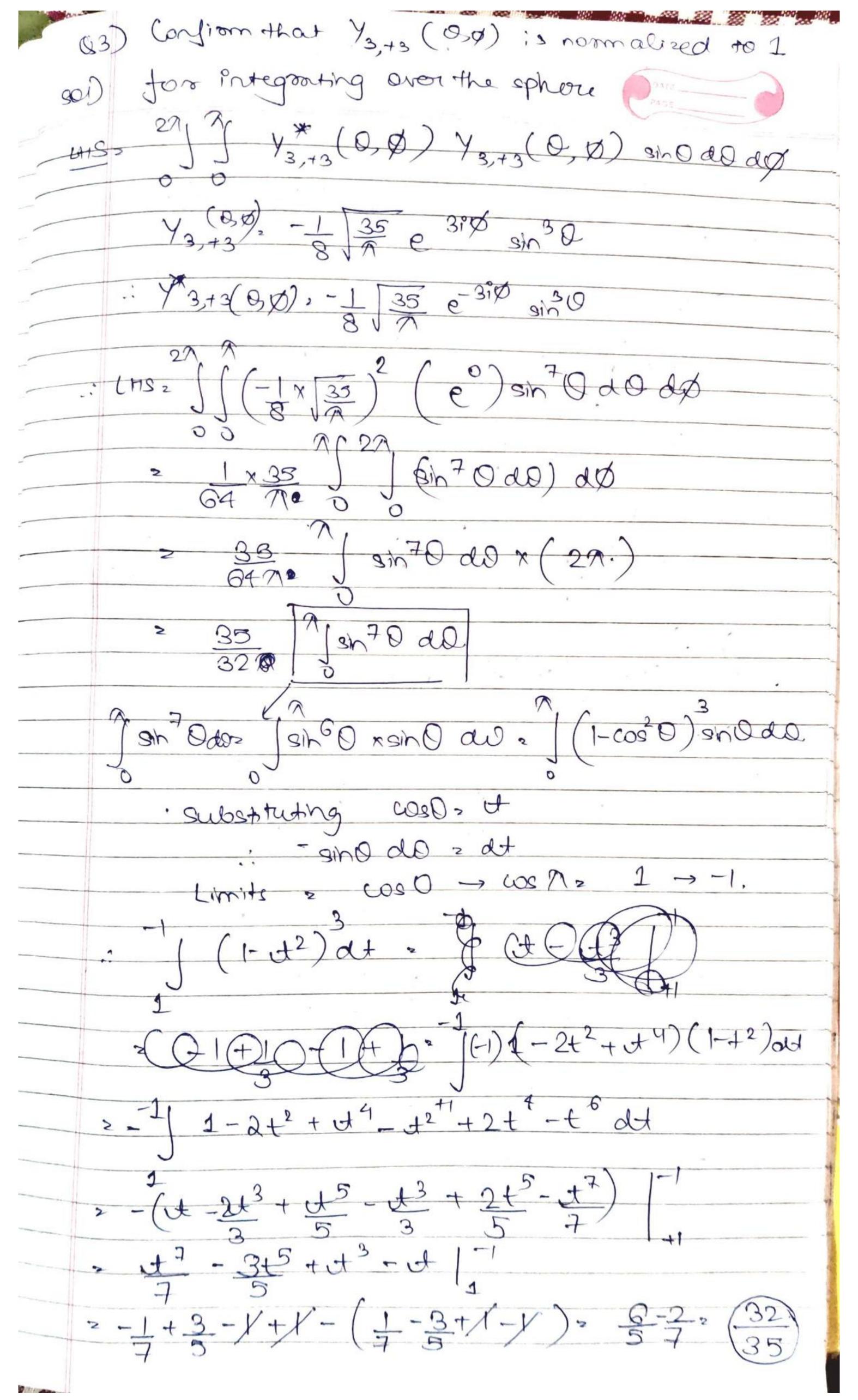
Kushagoa Agarwal 2018113012 1) Spherical hormonice are a set of functions used to sepresent functions on the swipace of the sphere. They are a higher dimensional complète basis for the set of percodic functions of a stigle variable. They are the eigenfunctions of the angular poort of the Laplacian in 3 dimensions. Proop orches of spherical harmonies! i) The aphorical hormonia are normalized 2755 yem (30) /4 (30) sholded=1 (i) Trèple posseult intégral rule (see Q5). Rétational : 199) They we osthogonal 275 / (0,0) /2, m (0,0) sinDaDap = S. i.e 2 1 if h2 b2, m, 2m2 else O. (Completeness proporty, ie, any well behaved funder of a and of caree written as

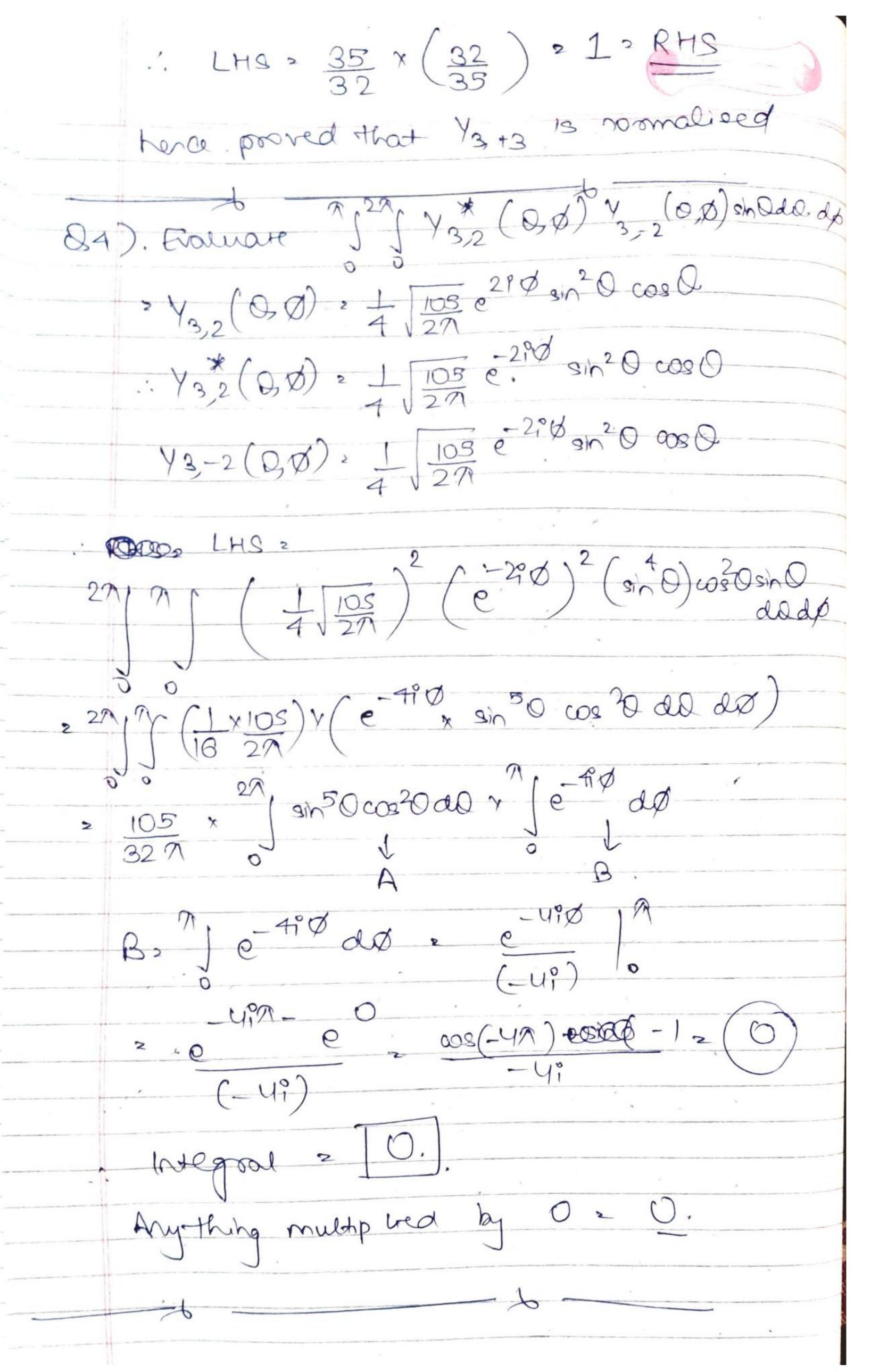
J(0,0), Z Z Z aen y (0,0) Appli costi or > Representation of grantational & magneric fields of planetory bodies. They also have disect applicability in computer graphics. Light transport involves 9ts ed over spherical/herrispherical demains

(12) Schrodinger & egn 2 - t2 (72 + V) 4 2 E W and as we are only concerned with opherical hormonies the reduceed egn & (200 30 (200) + 32) /2 - (e(1+1)sin20)) \$ (00 (00) 2 (00) 2 VA ne get LHS: O as constant sie diff 01 const 20 and RHS = 0 (l=0) : d(H1)sh20 es her ce it searistes schoolinger egn. E 2 trul (1+1) 2 . 0 de agules momentin = hyl(H1) as do angular momentumes b) $y_{2,-1}(0,\emptyset)^{2} = \frac{1}{2}\sqrt{\frac{15}{27}} e^{-\frac{9}{2}} \sin \theta \cos \theta$ LHS: 3420 3 15 e-10 (3002) 3h20) $\frac{15}{80} = \frac{100}{80} \left(\cos 20 \right) \times 2$ 20 (Jis e-PØ (cos 20 sin 0)) $\frac{15}{200} = \frac{15}{100} \left(\cos 0 \cos 20 + 6 \right) \left(\frac{9 \ln 0}{200} \right) \left(\frac{2 \sin 20}{200} \right)$ 22 4 5 15 8W00080 2 (30 e-18) $-\sqrt{\frac{15}{871}} \sin 0 \cos 0 (-i) (-i) (0)$









BS) a) 75 1 4 (0,0) 1,0 (0,0) 730 (0,0) and addig Is from class lectures we know that. all tople integral 15 Ve", me" Ve, me" ve, me = 0 unless me"= me'+ me to l'and el confron a toing le hore me 20 2 me 1 20 2 me but l'22, l'21 5 l23 connot bon a torangle as el"+u'2 el 1 in a triangle sum of 2 sides is always less er than the third ! integral = 0 1) 1 y y y sind all dis. Hore too me"2 m, 2 m, 20 satistying 14 but again a tolargle cannot be domed by e, l'il": "Integral 20) as et ué > el how pooring using integration. a) 42,0 2 1 5 (3 cos 20 -1) 1,0 2 1 3 cos0 Y30 = 4 7 (500030-3000) (1 5x3x7) (3co20-1)co20 (5co20-3co20) 2000 s we do not have dependence ever & now simply multiplying by the

