2_* In Δ AME we have:
M is the pt. of intersection of the 2 tangents [MA) & [ME) (given)
then, M is equidistant from A & E (tangent theorem: pt. of intersection of the 2 tangent is equidistant from pts. of tangencies)
so, MA = ME
thus, MAE is isosceles triangle at M (having 2 equal sides)
* M is the pt. of intersection of the 2 tangents [MA) & [ME) (given)
& O is the center of circle (C) (given)
so, (MO) is the perpendicular bisector of [AE] (tangent theorem: st. line joining pt. of intersection of the 2 tangents & the center of the circle is the perp. bisector of the chord formed by pts. of tangencies).
3_* In Δ GMF we have:
_ (MF) is tangent to (C) at E (given)
[OE] is radius of (C) (given)
then, [OE] & [MF] are perp. (tangent theorem ①: tangent & radius are perp.)
but G, O & E are collinear (given)
so, [GE] is a height relative to [MF]
_ (MG) is tangent to (C) at A (given)
[OA] is radius of (C) (given)
then, [OA] & [MG] are perp. (tangent theorem ②)
but A, O & F are collinear (given)
so, [FA] is a height relative to [MG]
but [GE] & [FA] intersects at O (given)
thus, O is the orthocenter of Δ GMF (pt. of intersection of the heights)