3) In $\triangle MGF$ we have:

(d) is tangent to (c) at A (given).

So, (MG) $\perp$ (FA) at A (Tangent theorem: tangent & radius are perp) Rule-a.

then, [FA) is a height relative to [MG].

(MF) is tangent to (c) at E (given)

So, (OE) $\perp$ (MF) at E (Tangent theorem; by-a)

but G, O & E are collinear (given)

then, [GE) is a height relative to [MF] at E.

but, (GE) & (FA) intersect at O

Thus, O is the orthocenter of $\triangle$ MGF. (intersection pt of 2 heights)

* O is orthocenter of $\triangle$ MGF (proved)

So, [MO) is a height relative to [GF] (line issued from vertex & pass through orthocenter).

So, (MO) $\perp$ (GF).

S is the orthogonal projection of O on [GF] (given)

then, (OS) $\perp$ (GF) at S.

hence, (MO) // (OS) (Two lines perp. to same st. line are parallel)

but O is a common pt.

Thus, pt M, O & S are collinear.

4) (OE) $\perp$ (MF) at E (proved)

So, $O\hat{E}F = 90°$

(OS) $\perp$ (GF) at S (proved)

So, $O\hat{S}F = 90°$.

Thus, quadrilateral EOSF is inscribed in a circle whose center is midpt of [OF] & diameter [OF] (Formed of two right $\triangle$'s sharing same hypotenuse)

5) In $\triangle$ MGF we have:

[MO) is the bisector of $A\hat{M}E$ (proved)

[MO) is a height relative to [GF] (proved)

Thus, $\triangle$ GMF is isosceles at M (having height as a bisector).