3) In $\triangle KMN$ we have:

K is the symmetric of N w.r.t P (given)

So, P is the midpt of [KN].

then, [MP) is a median relative to [KN] (st. line issued from vertex & pass through mid pt).

but, [PN) & [PM) are tangents to (c) at N & M resp. (given)

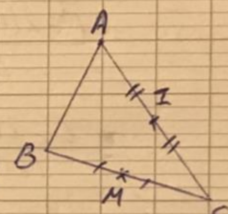
So, $PN = PM$ (tangent theorem: pt from which tangents are drawn to a circle is equidistant from pts of tangencies)

hence, $PN = PM = KP$.

Thus, $\triangle KMN$ is right at K (converse of median relative to hypotenuse)

$\boxed{a}$

4) M is midpt of [BC] (given)



So, $\vec{AB} + \vec{AC} = 2\vec{AM}$ (median & vectors)

I is the midpt of [AC] (given)

So, $\vec{MA} + \vec{MC} = 2\vec{MI}$ (median & vectors)

hence, $(\vec{AB} + \vec{AC}) + (\vec{MA} + \vec{MC}) = 2\vec{AM} + 2\vec{MI}$

$= 2(\vec{AM} + \vec{MI})$ (Chasles rule: Sum of consecutive vectors)

$= 2\vec{AI}$

$\boxed{a}$

Ex-2: part-A

1) $A = \left(\frac{1_{\times 2}}{3_{\times 2}} + \frac{1}{6}\right)^2 + \left(\frac{1}{2^3} + \frac{3}{4} \times \frac{5}{2}\right)$

$= \left(\frac{3_{\div 3}}{6_{\div 3}}\right)^2 + \left(\frac{1}{8} + \frac{15}{8}\right)$

$= \frac{1}{4} + \frac{16_{\div 2}}{8_{\div 2}}$

$= \frac{9}{4}$

$\boxed{\text{Thus, } A = \left(\frac{3}{2}\right)^2}$