Date:

(st. line joining exterior pt from which two tangents are drawn to center of circle is the bisector of the exterior angle formed by the two tangents)

b) In $\triangle DPB$ we have:
$D\hat{B}O = 90^\circ$ (proved)
$O\hat{D}B = 30^\circ$ (sum of angles in $\triangle DOB$)
but $[DO)$ is the bisector of $B\hat{D}E$ (proved)
then, $B\hat{D}E = 2O\hat{D}B$
$= 60^\circ$.
Hence, $\triangle DBP$ is semi-equilateral at B. (having 60° + 90°)

Thus, $PD = 2$ smallest side (hyp of a semi-equi $\triangle$)
$PD = 2DB$.

c) In $\triangle DPO$ we have:
$B\hat{D}E = 60^\circ$ (proved)
$O\hat{D}B = 30^\circ$ (proved)
→ then, $O\hat{D}E = 30^\circ$.
$\triangle PDB$ is semi-equilateral at B with $B\hat{D}P = 60^\circ$ (proved)
→ So, $O\hat{P}E = 30^\circ$
hence $\triangle OPD$ is isosceles at O (having two equal angles)
but $[DE)$ is tangent to (C) at E (given)
So, $(OE) \perp (PD)$ (tangent theorem: tangent and radius are $\perp$)

Then, (OE) is a height issued from main vertex of iso $\triangle POD$.
Hence, (OE) is a median relative to $[PD]$ at E.
Thus, E is the midpt of $[PB]$.