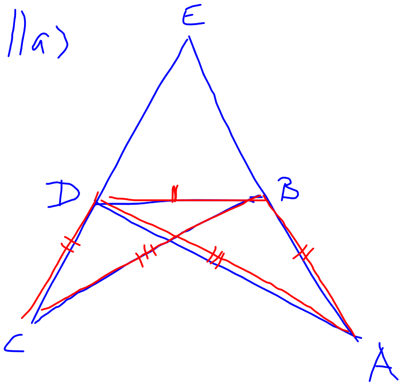
11a)



$\angle ABD = \angle BDC$ (matching sides in $\cong \triangle$'s)

$\angle EDB + \angle BDC = 180$ (straight $\angle EDC = 180$)

$\angle EDB = 180 - \angle BDC$

similarly

$\angle EBD = 180 - \angle ABD$

$= 180 - \angle BDC$

$\therefore \angle EDB = \angle EBD$

Thus $\triangle EDB$ is isosceles ($2 = \angle$'s)

13)

$$\alpha = \frac{1+\sqrt{5}}{2}$$

$$\alpha^2 = \alpha + 1$$

$$\frac{1}{\alpha} = \alpha - 1$$

$$\alpha^6$$

$$= (\alpha^2)^3$$

$$= (\alpha + 1)^3$$

$$= \alpha^3 + 3\alpha^2 + 3\alpha + 1$$

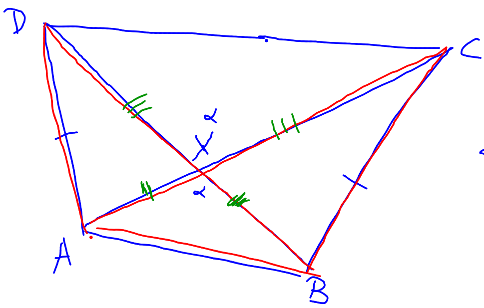
$$= \alpha(\alpha + 1) + 3\alpha + 3 + 3\alpha + 1$$

$$= \alpha^2 + 7\alpha + 4$$

$$= \alpha + 1 + 7\alpha + 4$$

$$= \underline{8\alpha + 5}$$

18d)



$\angle CXD = \angle AXB = \alpha$ (vertically opposite $\angle$'s)

$\angle XAB = \angle XBA$ (base $\angle$'s isosceles $\triangle XAB$)

$\angle AXB + \angle XAB + \angle XBA = 180$ ($\angle$ sum $\triangle XAB$)

$\alpha + 2\angle XAB = 180$

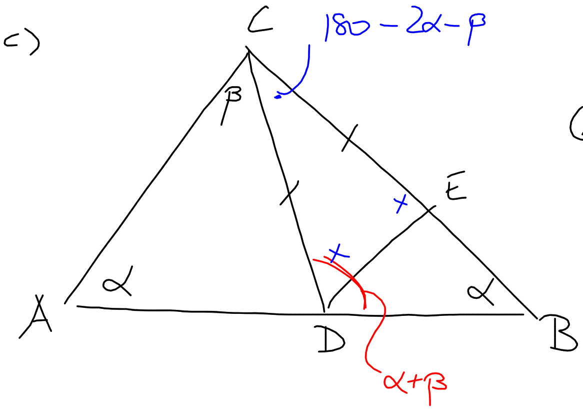
$2\angle XAB = 180 - \alpha$

similarly

$2\angle XCD = 180 - \alpha$

$\therefore \angle XAB = \angle XCD$

2(c)



(i) exterior $\angle$ $\triangle DAC$

(ii) $\angle DCB + \angle BDC + \angle DBC = 180$ ($\angle$ sum $\triangle DCB$)

$\angle DCB + \alpha + \beta + \alpha = 180$

$\underline{\angle DCB = 180 - 2\alpha - \beta}$

$\triangle DEC$ is isosceles ($CE = DC$)

$\therefore \angle CDE = \angle DEC = \gamma$

$\angle DCE + \angle DEC + \angle EDC = 180$ ($\angle$ sum $\triangle DEC$)

$180 - 2\alpha - \beta + \gamma + \gamma = 180$

$2\gamma = 2\alpha + \beta$

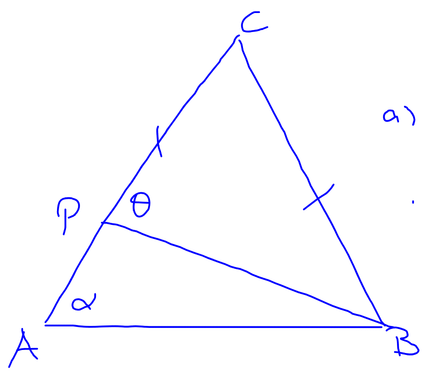
$\gamma = \alpha + \frac{1}{2}\beta$

$\angle BDC = \angle BDE + \angle EDC$ (common $\angle$)

$\alpha + \beta = \angle BDE + \alpha + \frac{1}{2}\beta$

$\angle BDE = \frac{1}{2}\beta$

26/



a) $\theta = \alpha + \angle PBA$ (exterior $\angle$, $\triangle PBC$)

$\therefore \underline{\theta > \alpha}$.

b) $\angle CBP = \theta$ (= $\angle$'s in isosceles $\triangle PBC$)

c) $\alpha < \theta$

$\alpha < \angle CBP$

$\angle CBA = \angle CBP + \angle PBA$ (common $\angle$)

$\angle CBA > \angle CBP$

ie $\angle CBP < \angle CBA$

$\therefore \underline{\alpha < \angle CBA}$