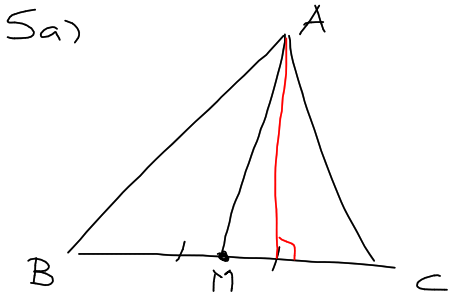
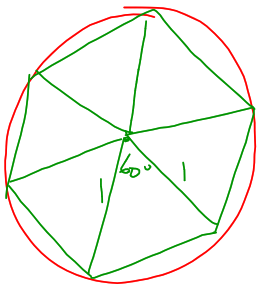
Sa)



12 a) (i) $\frac{3\sqrt{3}}{2}$ (ii) $A = \frac{1}{2}(1)(1)\sin 60^\circ$

b) (i) $2\sqrt{3}$ (ii) $= \frac{1}{2} \times \frac{\sqrt{3}}{2}$

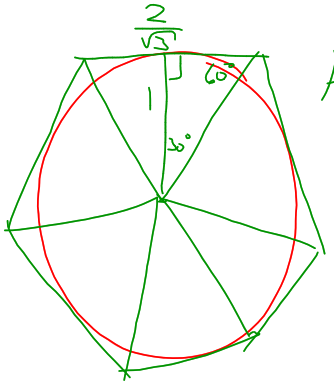
$= \frac{\sqrt{3}}{4}$




$A_{hex(in)} < A_{circle} < A_{hex(out)}$

$\frac{3\sqrt{3}}{2} < \pi(1)^2 < 2\sqrt{3}$

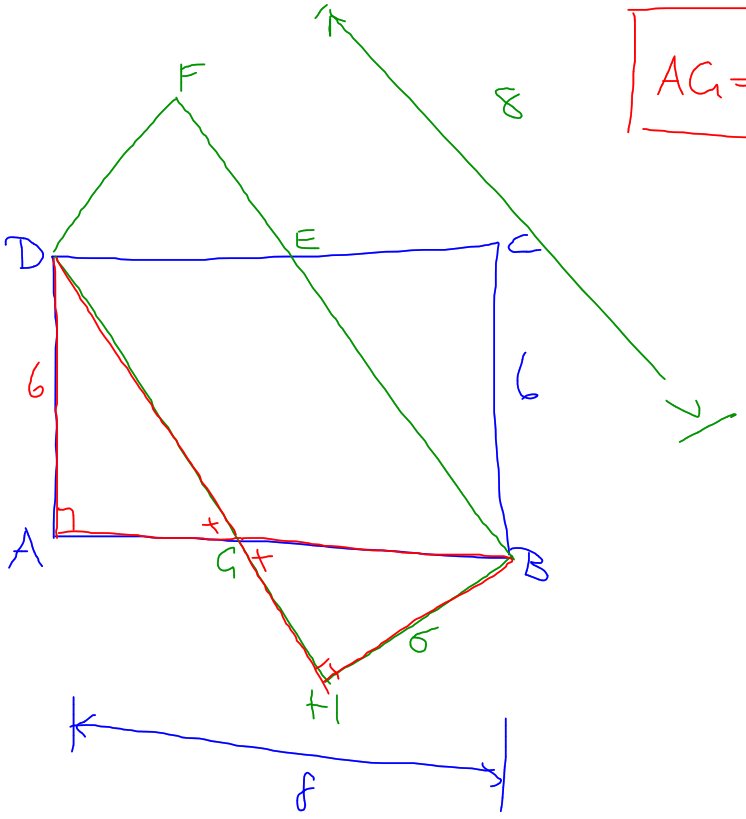
$\frac{3\sqrt{3}}{2} < \pi < 2\sqrt{3}$




$A = \frac{1}{2}\left(\frac{2}{\sqrt{3}}\right)(1)$

$= \frac{1}{\sqrt{3}}$

13b)




$$AG = \frac{AB^2 - AD^2}{2AB}$$

$$AC = \frac{AB^2 - AD^2}{2AB}$$

$CD^2 = AD^2 + AC^2 \quad \ldots (1)$

$BC^2 = BH^2 + CH^2$

$AB = AC + BC$

$AB = AC + CD \quad \ldots (2)$

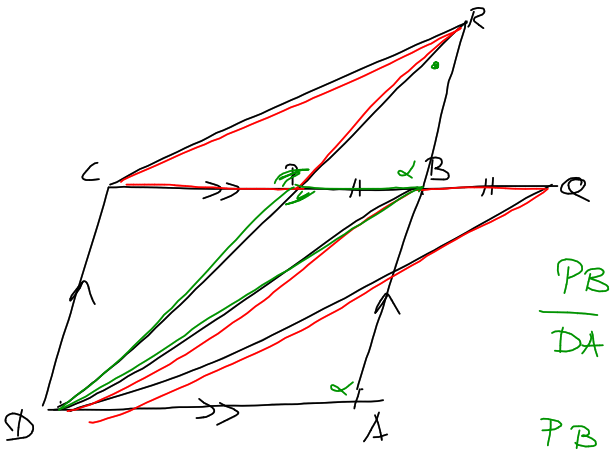
$(AB - AC)^2 = AD^2 + AC^2$

$AB^2 - 2AB \cdot AC + AC^2 = AD^2 + AC^2$

$2AB \cdot AC = AB^2 - AD^2$

$$AC = \frac{AB^2 - AD^2}{2AB}$$

15a)




Area $\triangle DQB$ = Area $\triangle CPR$

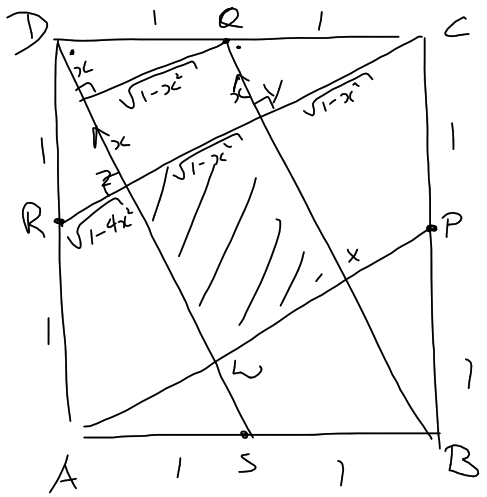
$$\frac{PB}{DA} = \frac{PR}{DR}$$

$$\frac{PB}{CP+PB} = \frac{PR}{DP+PR}$$

$$PB\cdot(DP+PR) = PR(CP+PB)$$

$$PB\cdot DP = PR\cdot CP$$

15b)




$$\sqrt{1-4x^2} + 2\sqrt{1-x^2} = \sqrt{5}$$