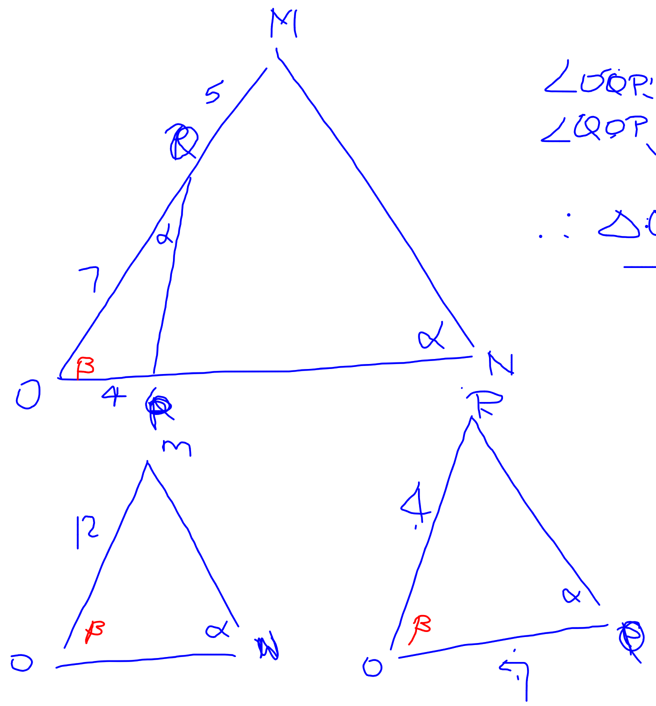
6b)



$\angle OQR = \angle ONM = \alpha$ (given)

$\angle QOP = \angle NOM$ (common $\angle$)

$\therefore \underline{\Delta OQR \parallel\!| \Delta ONM}$ (AA)

$\frac{ON}{OQ} = \frac{OM}{OP}$ (ratio of sides in ||| Δ's)

$\frac{ON}{7} = \frac{12}{4}$

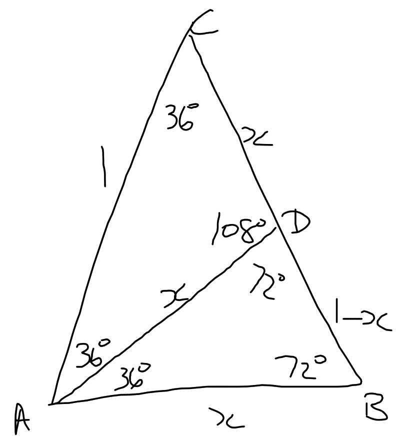
$ON = 21$

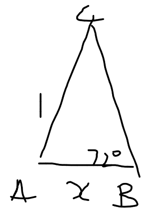
$ON = OP + PN$ (common side)

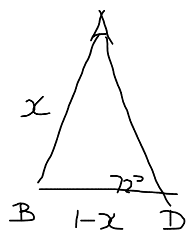
$21 = 4 + PN$

$\underline{PN = 17}$

16.







$$\frac{x}{1} = \frac{1-x}{x}$$ (ratio of sides $|||$ $\triangle$'s)

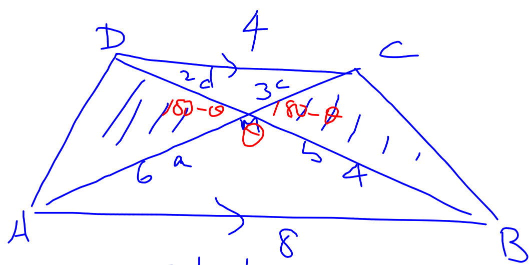
$$x^2 = 1 - x$$

$$x^2 + x - 1 = 0$$

$$x = \frac{-1 \pm \sqrt{5}}{2}$$

$$\therefore x = \frac{-1+\sqrt{5}}{2}$$ $(\because x > 0)$

18a (mc)

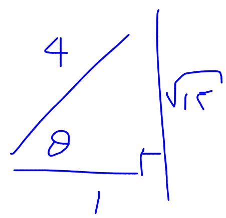


ad = bc

$$\cos\theta = \frac{6^2+4^2-8^2}{2\times 6\times 4}$$

$$= \frac{-12}{48}$$

$$= -\frac{1}{4}$$



$$\sin\theta = \frac{\sqrt{15}}{4}$$

(iii) Area $= \frac{1}{2} \times 4 \times 6 \times \sin\theta + \frac{1}{2} \times 2 \times 3 \times \sin\theta$

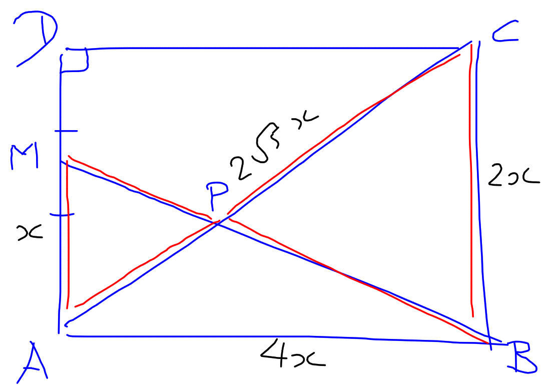
$$+ 2 \times \frac{1}{2} \times 2 \times 6 \times \sin(180 - \theta)$$

$$= (12 + 3 + 12)\sin\theta$$

$$= 27 \times \frac{\sqrt{15}}{4}$$

$$= \frac{27\sqrt{15}}{4} \text{ units}^2$$

20c)



b) $3 \times CP = 2 \times CA$

$AB = 2BC$

$AB^2 = 4BC^2$

c) $9 \times CP^2 = 5 \times AB^2$

$CA^2 = AB^2 + BC^2$

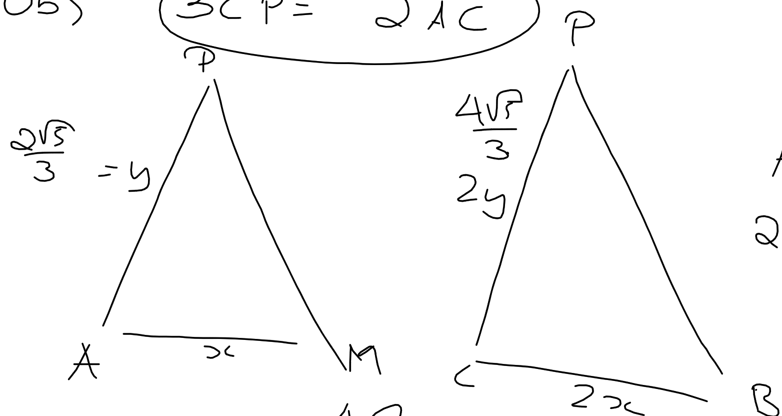
$4CA^2 = 4AB^2 + 4BC^2$

$9CP^2 = 4AB^2 + 4BC^2$

$= 4AB^2 + AB^2$

$= 5AB^2$

20b) $3CP = 2AC$



$AC = 2\sqrt{5}\,x$

$AC = AP + PC$

$2\sqrt{5}\,x = 3y$

$y = \frac{2\sqrt{5}}{3}$

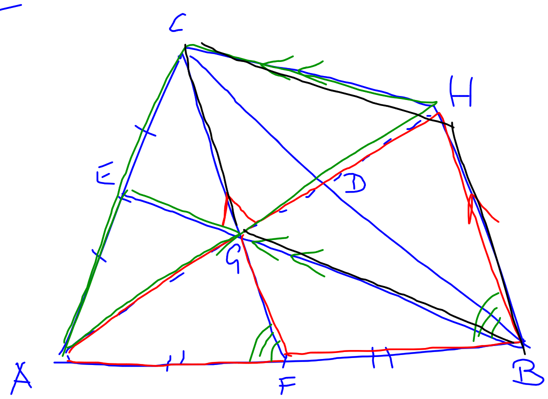
$3PC = 3 \times \frac{4\sqrt{5}}{3} x$

$= 4\sqrt{5}\,x$

$2AC = 2 \times 2\sqrt{5}\,x$

$= 4\sqrt{5}\,x$

21

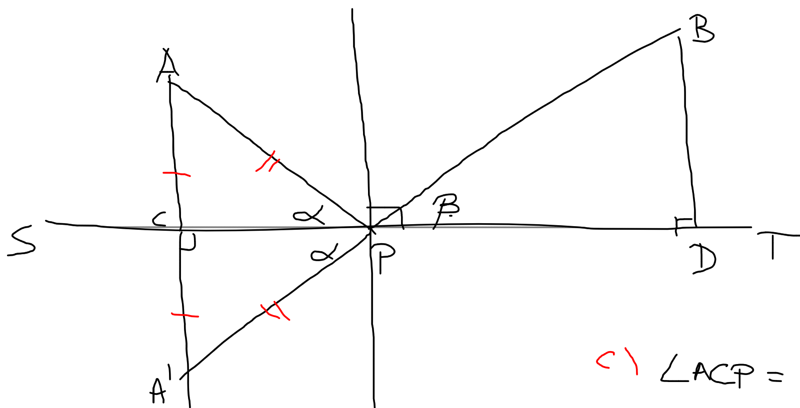


b) $\angle AFG = \angle ABH$ (matching $\angle$'s in ||| $\triangle$'s)

$\therefore FC \parallel BH$ (corresponding $\angle$'s =)

ie $GC \parallel BH$

24



a) SP is an axis of symmetry

$\therefore AC = AA'$

$AP = A'P$.

PC is common

$\therefore \triangle ACP \equiv \triangle A'CP$ (SSS)

c) $\angle ACP = \angle BDP = 90^\circ$ (given)

$\angle APC = \angle A'PC = \alpha$ (matching sides $\equiv \triangle$'s)

$\angle BPD = \angle A'PC$ (vertically opposite $\angle$'s)

$\therefore \angle APC = \angle BPD$

$\triangle APC \mathbin{|||} \triangle BPD$ (AA)