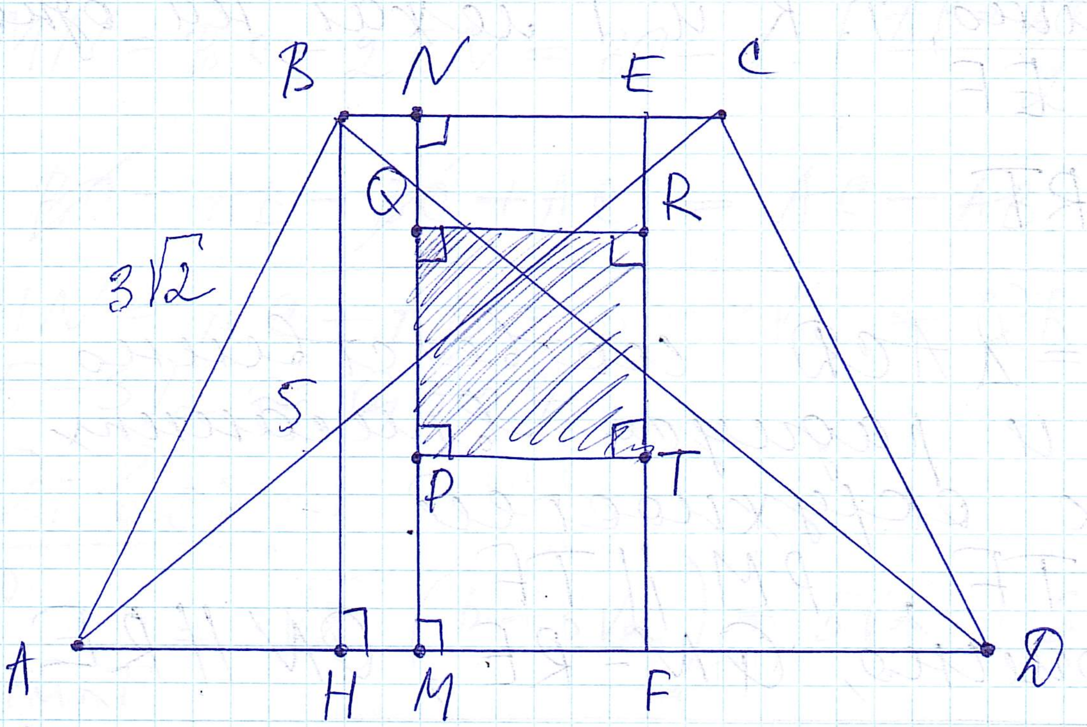
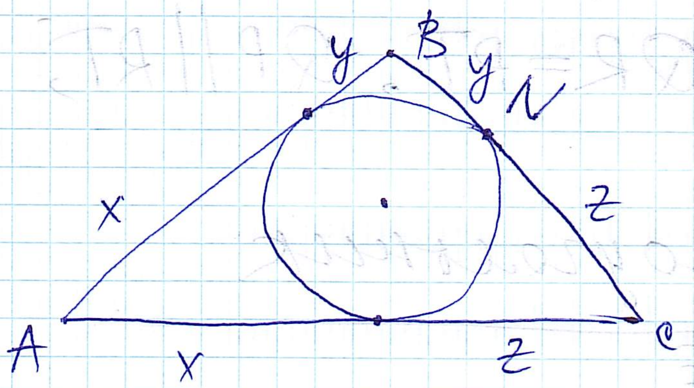


Пусть $BC < AD$



$2x + 2y + 2z = P_{ABC}$

$p = x + y + z$

$x = p - (y+z) = p - BC$

$y = p - AC$

$z = p - AB$

$BN = p_{ABC} - AC$ из $\triangle ABC$

$AM = p_{ABD} - BD$ из $\triangle ABD$

$$AM - BN = p_{ABC} - BD - (p_{ABD} - AC) = \frac{AB + BC + AC}{2} - BD - \frac{AB + BD + AD}{2} - AC = \frac{AD - BC}{2} = AH$$

Так как $PM \perp AD$, $QN \perp BC$, $BH \perp AD$ и $BN = HM$, т.е. точки Q и P равноудалены от BH. Значит, т. Q и P лежат на одной прямой $NM \parallel BH$.