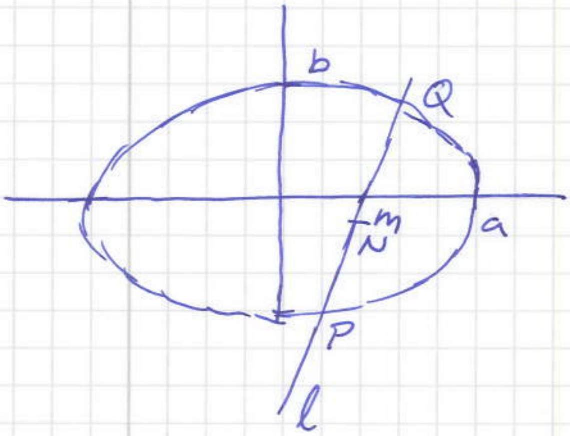
8) $b^2x^2 + a^2y^2 = a^2b^2 \qquad a > b \quad M = (m, 0)$



N = MIDTPUNKTET PÅ KORDEN.

$N = (x_n, y_n)$

$P = (x_P, y_P)$

$Q = (x_Q, y_Q)$

$$N = \frac{1}{2}(P + Q) = \left(\frac{x_P + x_Q}{2}, \frac{y_P + y_Q}{2}\right).$$

$L: \ y = kx + b' \qquad M \in L \Rightarrow \ 0 = km + b' \Rightarrow b' = -km$

$\qquad y = k(x - m)$

$$E, L: \ y^2 = -\frac{b^2}{a^2}x^2 + b^2 = (k(x-m))^2$$

$$\Rightarrow \left(k^2 + \frac{b^2}{a^2}\right)x^2 - 2k^2mx + m^2k^2 - b^2 = 0$$

$$x_N = \frac{x_P + x_Q}{2} = \frac{\cancel{2}k^2m}{\cancel{2}\left(k^2 + \frac{b^2}{a^2}\right)} = \frac{a^2k^2m}{a^2k^2 + b^2}$$

$$y_N = k(x_N - m) = \frac{a^2k^3m - a^2k^3m - kmb^2}{a^2k^2 + b^2} = km\frac{a^2(k^2 - k^2)}{a^2k^2 + b^2}$$

$$= \frac{-b^2km}{a^2k^2 + b^2}$$

$$X_N = k^2 m \frac{a^2}{a^2k^2+b^2}$$

$$(a^2k^2+b^2)X_N - k^2 m a^2 = 0$$

$$(a^2 \cdot x_N - a^2 m)k^2 + b^2 X_N = 0$$

$$k^2 = \frac{-b^2 X_N}{a^2(x_N - m)}$$

$$Y_N^2 = \left(-km \frac{b^2}{a^2k^2+b^2}\right)^2 = \frac{k^2m^2b^4}{(a^2k^2+b^2)^2}$$

$$(a^2 \cdot k^2 + b^2)^2 y_N^2 + k^2 m^2 b^4 = 0$$

$$\left(\frac{-b^2 x_N}{x_N - m} + b^2\right)^2 Y_N^2 + \frac{b^2}{a^2}\frac{X_N}{X_N - m} \cdot m^2 \cdot b^4 = 0$$

$$\frac{b^4(x_N - X_N - m)^2}{(X_N - m)^2} Y_N^2 + \frac{m^2 b^6}{a^2}\frac{X_N}{(X_N - m)} = 0$$

$$(-m)^2 Y_N^2 + \frac{m^2b^2}{a^2} X_N (X_N - m) = 0$$

$$m^2 y_N^2 + \frac{m^2 b^2}{a^2} X_N - \frac{m^3 b^2}{a^2} X_N = 0$$

$$a^2 y_N^2 + b^2 x_N - m b^2 X_N = 0$$

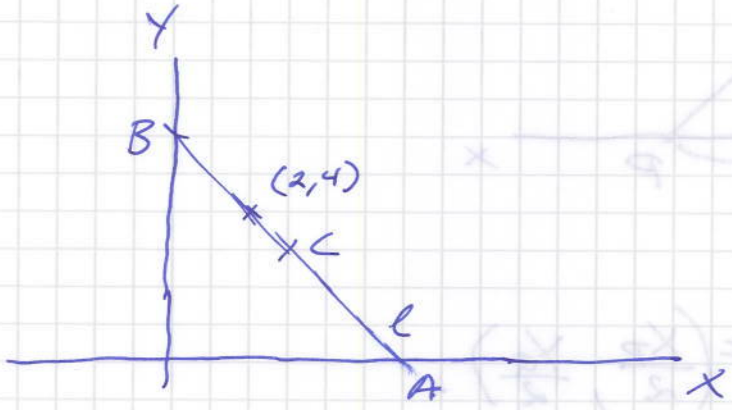
$$a^2 y_N + b^2\left(X_N - \frac{m}{2}\right)^2 = b^2 \frac{m^2}{4}$$

$$\frac{\left(X_N - \frac{m}{2}\right)^2}{a^2} + \frac{Y_N^2}{b^2} = \frac{m^2}{4a^2}$$

$$\boxed{\frac{\left(X_N - \frac{m}{2}\right)^2}{\frac{m^2}{4}} + \frac{Y_N^2}{\frac{m^2 b^2}{4a^2}} = 1}$$

9) HOPPES OVER P.G.A. OBLIG OPPGAVE 3

10)



$l: y = kx + b \Rightarrow 4 = k \cdot 2 + b \Rightarrow b = 4 - 2k$

$= kx + 4 - 2k$

$B: (x_B, y_B) = (0, 4-2k)$

$A: (x_A, y_A) = \left(\frac{2k-4}{k}, 0\right)$

$C: \left(\frac{k-2}{k}, 2-k\right) \qquad y_c = 2 - k \Rightarrow k = 2 - y_c$

$$x_c = \frac{k-2}{k} = \frac{(2-y_c)-2}{(2-y_c)} = \frac{-y_c}{(2-y_c)}$$

$\Rightarrow x_c(2-y_c) = -y_c$

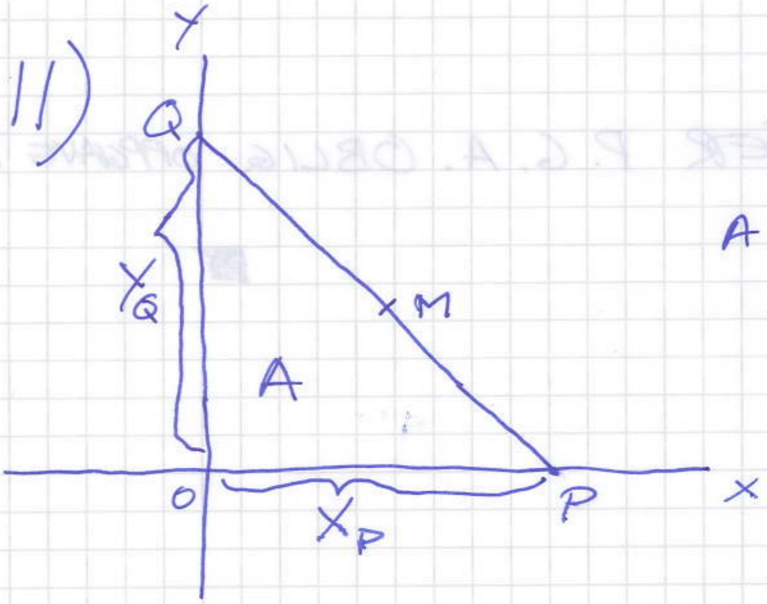
$2x_c - x_c y_c + y_c = 0$

$x_c y_c - 2x_c - y_c = 0$

$$\underline{\underline{(x_c - 1)(y_c - 2) = -2}}$$

HYPERBEL MED ASSYMPTOTER $x_c = 1, y_c = 2$

11)



A = AREAL AV TREKANTEN.

$$M = (X_M, Y_M) = \left(\frac{X_P}{2}, \frac{Y_Q}{2}\right)$$

$$A = \frac{X_P Y_Q}{2} = \frac{2X_M \cdot 2Y_M}{2} \Rightarrow \underline{\underline{X_M Y_M = \frac{A}{2}}}$$

$\blacksquare$