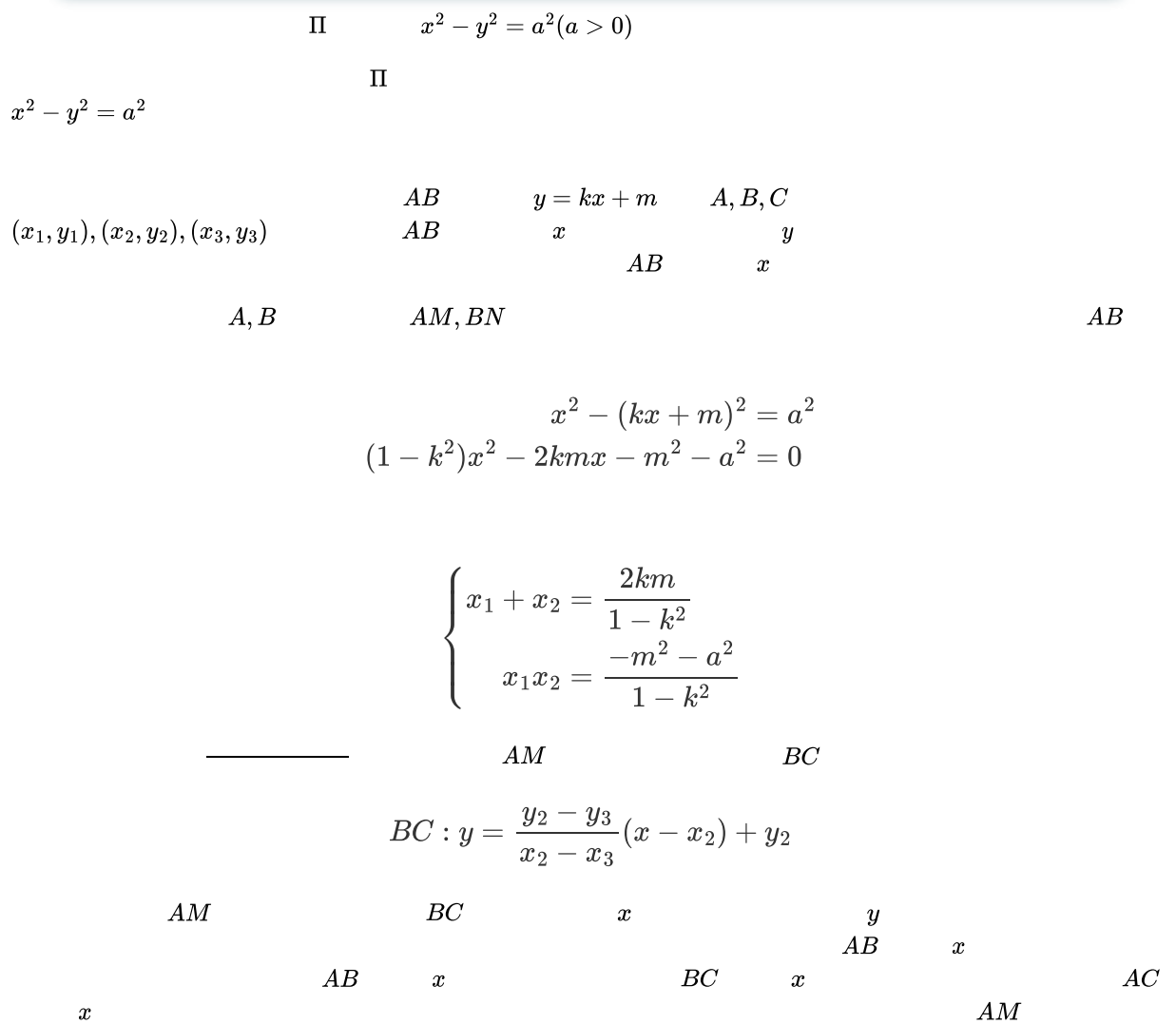


$$Q \quad \Pi \quad P \quad AB \quad P \quad AB \quad \Pi \quad Q$$
$$\triangle PAB$$



$$\Pi \quad \pi \quad \prod_{i=1}^n a_i = a_1 a_2 a_3 \dots a_n$$

$$A, B, C \quad \Pi \quad \triangle ABC \quad \Pi$$



$$AM : y = \frac{x_3 - x_2}{y_2 - y_3}(x - x_1) + y_1$$

BN

AM

$$BN : y = \frac{x_3 - x_1}{y_1 - y_3}(x - x_2) + y_2$$

$$\begin{array}{cccccccccccccccc} & & & & AB, BC, CA & & & & AM & & B(x_2, y_2)C(x_3, y_3) & & & & & & \\ A(x_1, y_1) & BN & A(x_1, y_1), C(x_3, y_3) & & & & & & B(x_2, y_2) & & & & B & A & & & \\ & AM & x_2 & x_1 & x_1 & x_2 & y_2 & y_1 & y_1 & y_2 & & & BN & & & & \\ & & & & BN & & & & & & & & & & & & \end{array}$$

AM BN

P P

$$\begin{cases} y = \frac{x_3 - x_2}{y_2 - y_3}(x - x_1) + y_1 \\ y = \frac{x_3 - x_1}{y_1 - y_3}(x - x_2) + y_2 \end{cases}$$

P

$$\left\{ \begin{aligned} x_P &= \frac{y_2 - y_1 + \frac{x_1(x_3 - x_2)}{y_2 - y_3} - \frac{x_2(x_3 - x_1)}{y_1 - y_3}}{\frac{x_3 - x_2}{y_2 - y_3} - \frac{x_3 - x_1}{y_1 - y_3}} \\ &= \frac{(y_2 - y_1)(y_2 - y_3)(y_1 - y_3) + x_1(x_3 - x_2)(y_1 - y_3) - x_2(x_3 - x_1)(y_2 - y_3)}{(x_3 - x_2)(y_1 - y_3) - (x_3 - x_1)(y_2 - y_3)} \\ &= \frac{k(x_2 - x_1)(kx_2 + m - y_3)(kx_1 + m - y_3) + x_1(x_3 - x_2)(kx_1 + m - y_3) - x_2(x_3 - x_1)(kx_2 + m - y_3)}{(x_3 - x_2)(kx_1 + m - y_3) - (x_3 - x_1)(kx_2 + m - y_3)} \\ &= \frac{k(x_2 - x_1)[k^2x_1x_2 + k(m - y_3)(x_1 + x_2) + (m - y_3)^2] + k[(x_1 - x_2)(x_3(x_1 + x_2) - x_1x_2)]}{(kx_3 + m - y_3)(x_1 - x_2)} \\ &= \frac{k(x_2 - x_1)[k^2 \cdot \frac{-m^2 - a^2}{1 - k^2} + k(m - y_3) \cdot \frac{2km}{1 - k^2} + (m - y_3)^2] + k[(x_1 - x_2)(x_3 \cdot \frac{2km}{1 - k^2} + \frac{m^2 + a^2}{1 - k^2})]}{(kx_3 + m - y_3)(x_1 - x_2)} \\ &= \frac{k(x_2 - x_1)[-k^2m^2 - k^2a^2 + 2k^2m^2 - 2k^2my_3 + (1 - k^2)(m - y_3)^2] + k(x_1 - x_2)(2kmx_3 + (1 - k^2)(kx_3 + m - y_3))}{(1 - k^2)(kx_3 + m - y_3)} \\ &= \frac{[k^3m^2 + k^3a^2 - 2k^3m^2 + 2k^3my_3 + k^3m^2 - 2k^3my_3 + k^3y_3^2 - km^2 + 2kmy_3 - ky_3^2 + 2k^2ma - 2k^2my_3 + 2k^2m^2 - 2k^2my_3 + y_3^2] + k^2(2mx_3 - mx_3 + x_3y_3) + k(-m^2 + 2m^2 - 2m^2 + 2my_3 + m^2 - 2my_3 + y_3^2)}{(1 - k^2)(kx_3 + m - y_3)} \\ &= \frac{[(a^2 + y_3^2)k^3 + x_3(m + y_3)k^2 + (2my_3 - y_3^2 + a^2)k + mx_3 - x_3y_3]}{(1 - k^2)(kx_3 + m - y_3)} \\ &= \end{aligned} \right.$$