since we know O_x, O_y

$q_1 \cdot q_1$

$(-f_x r_{11} + O_x r_{31})^2 + (-f_x r_{12} + O_x r_{32})^2 + (-f_x r_{13} + O_x r_{33})^2$

$f_x^2 r_{11}^2 - 2 f_x O_x r_{11} r_{31} + O_x^2 r_{31}^2 +$

$f_x^2 r_{12}^2 - 2 f_x O_x r_{12} r_{32} + O_x^2 r_{32}^2 +$

$f_x^2 r_{13}^2 - 2 f_x O_x r_{13} r_{33} + O_x r_{33}^2 +$

$f_x^2 (r_{11}^2 + r_{12}^2 + r_{13}^2) - 2 f_x O_x (r_{11} r_{31} + r_{12} r_{32} + r_{13} r_{33}) + O_x^2 (r_{31}^2 + r_{32}^2 + r_{33}^2$

$f_x^2 + O_x^2 = q_1 \cdot q_1 \quad \Rightarrow f_x = \sqrt{q_1 \cdot q_1 - O_x^2}$

compute f_y similarly, know $f_x, f_y, O_x, O_y, r_{31}, r_{32}, r_{33}, T_z$

$q_2 \cdot q_2$

compute rest is easy