(a) If p is symmetric then $orb(p) = \{p\}$

(as $\alpha * p = p$ for all $\alpha \in S_n$).

(b) (i) $x_1^2 + x_2^2 + x_3^2 = (x_1 + x_2 + x_3)^2 - 2(x_1x_2 + x_2x_3 + x_3x_1)$

$= e_1^2 - 2e_2.$

(ii) $x_1^2x_2 + x_1^2x_3 + x_2^2x_1 + x_2^2x_3 + x_3^2x_1 + x_3^2x_2$

$= (x_1x_2 + x_2x_3 + x_3x_1)(x_1 + x_2 + x_3) - 3x_1x_2x_3$

$= e_2e_1 - 3e_3.$

(iii) $x_1^3 + x_2^3 + x_3^3$

$= (x_1 + x_2 + x_3)^3 - 3(x_1^2x_2 + x_1^2x_3 + x_2^2x_1 + x_2^2x_3 + x_3^2x_1 + x_3^2x_2)$

$- 6x_1x_2x_3$

$= e_1^3 - 3(e_2e_1 - 3e_3) - 6e_3$

$= e_1^3 - 3e_2e_1 + 3e_3.$