Solution to Problem 9. (See Solution to Problem 3 from Quiz 5, sec.

Solution to Problem 10 (a) By Lagrange's Theorem, every subgroup H of G has either 2 or p elements.

If $|H|=2$, then $H=\{e,a\}=\langle a\rangle$ is a cyclic group generated by a.

If $|H|=p$, then any element in H except e has order p. Take $h\in H$, $h\neq e$. Then $ord(h)=p$. Hence $|\langle h\rangle| = |H|$ and then $\langle h\rangle = H$. It implies H is a cyclic subgroup generated by h.

(b) Let $|G|=p^2$. Then $\forall\, h\in G$, $h\neq e$, order of h is either p or p^2 (by Lagrange's Theorem). Take any $h\neq$
If order of h is p then we found an element of ~~of~~ order p and there is nothing to prove.

If order of h is p^2, consider $a = h^p = \underbrace{h\circ h\circ\ldots\circ h}_{p \text{ times}}$

Then $a\neq e$ and $a^p = (h^p)^p = e$, i.e. order of a is p. Again, we found an element of order p.