

Year: 2011	Vol.: 78	Fasc.: 1
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Title: On minimal non- p -closed groups and related properties

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Let p be a prime. A group is called p -closed if it has a normal Sylow p -subgroup and it is called p -exponent closed if the elements of order dividing p form a subgroup. A group is minimal non- p -closed if it is not p -closed but its proper subgroups and homomorphic images are p -closed. Similarly, a group is called minimal non- p -exponent closed if it is not p -exponent closed but all its proper subgroups and homomorphic images are p -exponent closed. In this paper we characterize finite minimal non- p -closed groups and investigate the relationship between them and minimal non- p -exponent closed groups. In particular, we show that every minimal non- p -closed group is non- p -exponent closed and that minimal non- p -closed groups and simple minimal non- p -exponent closed groups have cyclic Sylow p -subgroups. Furthermore, given a prime p , we describe non- p -exponent closed groups of smallest order and we show that they coincide with non- p -closed groups of smallest order.

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