

Easy question in algebra

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Hi,

I suppose this is an easy question in algebra:

Let p, q be prime. Let further $p=2q+1$. Let g be an element of order q of the multiplicative group Z_p^* . So g is a generator of the order- q subgroup of Z_p^* . Every element $h=g^x$, for $x \in \{1, \dots, q-1\}$ is a generator of G . Is this correct? I suppose yes. Why is it not correct for $x= q$? Is the reason for that, that $g^q = 1$ and 1 is not a generator of G ?

Thanks for your help

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