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#1) a.  $H \leq G$ ? Yes.

$H$  closed under group law of  $G$ ? Y

Not a subgroup: ~~Inverse of~~  $5 \in \mathbb{R}^+$ , but inverse  $-5$  is not.  
So  $H$  is not closed under inverses.

b.  $K \leq G$ ? Yes.

$K$  closed under group law of  $G$ ? Yes.  $(a+b\sqrt{5})+(c+d\sqrt{5})=(a+c)+(b+d)\sqrt{5}$   
Since  $a, b, c, d \in \mathbb{Z}$ , ~~so~~  $(a+c)$  and  $(b+d) \in \mathbb{Z}$

$K$  contains identity of  $G$ ? (which is 0) Yes, since  $0=0+0\sqrt{5}$ .

$K$  closed under inverses? Yes.  $\forall k \in K$ , inverse is  $-k$ . p.g.  $(a+b\sqrt{5})^{-1} = -a-b\sqrt{5}$

So  $K$  is a subgroup

because  $(a+b\sqrt{5})+(-a-b\sqrt{5})=0$