$G = S_4$ $H = \langle (1234) \rangle = \langle \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 1 \end{pmatrix} \rangle = \{ e, (1234), (13)(24), (1432) \}$

(i) 6.

size of G is 24. size of H is 4.

the number of cosets of H is $24 \div 4 = 6$

(ii) no.

$(12)(1234)(12)^{-1} = (12)(1234)(12) = (1342)$. which is not in H.

~~they~~ are 1, 3, 7, 9, 11, 13, 17, 19

~~(1)~~ 1 ~~(2)~~ 3 ~~(4)~~

~~(5)~~ (6) 7 ~~(8)~~ 9

(10) 11 ~~(12)~~ 13 ~~(14)~~

~~(15)~~ (16) 17 ~~(18)~~ 19

$20 = 2 \cdot 2 \cdot 5$