Please PRINT your name _____

No calculators, cell phones, computers, notes, etc.

Make your work correct, complete and coherent.

Please take a picture of your quiz (for your records) just before you turn the quiz in. I will e-mail your grade and my comments to you. I will keep your quiz.

The quiz is worth 5 points. The solutions will be posted on my website later today.

Quiz 5, March 22, 2023

Suppose that H is a subgroup of the group G and ghg^{-1} is in H for all $g \in G$ and $h \in H$. Let a, b, c, and d be elements of G with $aH = bH$ and $cH = dH$. Prove that $acH = bdH$.

Answer: The cosets aH and bH are equal; so there is an element $h_1 \in H$ with $a = bh_1$; and the cosets cH and dH are equal; so there is an element $h_2 \in H$ with $c = dh_2$. Thus,

$$acH = bh_1cH = bc(c^{-1}h_1c)H.$$

The ambient hypothesis ensures that $c^{-1}hc \in H$. It follows that

$$acH = bcH = bdh_2H = bdH.$$