

Day 21

Comfort food

Turn to someone sitting next to you and take about 2 minutes to discuss:

Do you have a go-to comfort food? If so, what is it? If not, do you have some other go-to comfort activity?

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- ▶ See Zulip for more.

Normal Subgroups

1. "The subgroup of all rotations is a normal subgroup of D_n ."

This statement is...

(A) True.

(B) False.

2. Define

$$B = \left\{ \begin{bmatrix} a & b \\ 0 & a^{-1} \end{bmatrix} \mid a \in \mathbf{R}^*, b \in \mathbf{R} \right\}$$
$$U = \left\{ \begin{bmatrix} 1 & b \\ 0 & 1 \end{bmatrix} \mid b \in \mathbf{R} \right\}$$

Observe that B is a group under matrix multiplication and U is a subset of B . Which of the following is most accurate?

- (A) U is *not* a subgroup of B .
- (B) U is a subgroup of B , but *not* a normal subgroup.
- (C) U is a normal subgroup of B .

No voting! Work with your neighbor to prove:

3. If H is a subgroup of a group G and $|G : H| = 2$, then H is normal in G .