Take-home Exam

ⓘ This is a preview of the published version of the quiz

Started: Apr 14 at 8:16pm

Quiz Instructions

This is the take-home exam. The exam is due on December 4, 11:59 pm PST. Until then, you are free to use as much time as you wish when working on the exam.

Furthermore, the exam is open-book and open-internet. You may use materials online and in the readings, but you may not consult other students about the exam.

Question 1 — 1 pts

A group is a set of objects with a binary operator which has satisfy various conditions. Suppose G is a set of elements with a binary operation $\star$. Select each condition which is required for $(G, \star)$ to be an group:

- [ ] For any elements f, g, and h in G, (f * g) * h = f * (g * h).
- [ ] There exist an identity element e in G such that for all g in G, g * e = e * g = g.
- [ ] For all elements g in G, there exists an element g^{-1} in G such that g * g^{-1} = g^{-1} * g = e.
- [ ] For any elements f, g in G, f * g = g * f.
- [ ] For any elements f, g in G, the element f * g is also in G.

Question 2 — 1 pts

What is the order of the following cycle given in cycle notation (Please enter an integer):

(1 2 3 4 5) (6 7 8)

Question 3

1 pts

True or False: The following cycle has an even parity:

(1 2 3 4)

- ◯ True
- ◯ False

Question 4

1 pts

True or False: The cube always has an even parity (the number of cubies exchanged from the starting position is always even).

- ◯ True
- ◯ False

Question 5

1 pts

Find the order of the subgroup of the Rubik's cube generated by the following element:

(R' L F R L' U')

Question 6

1 pts

Which of the following choices is the **inverse** of the following moves:

R U L R'

- ◯ R' U' L' R
- ◯ R U L R
- ◯ R L' U' R'
- ◯ R' L' U' R'

Question 7

1 pts

True or False: The following two group elements are the same:

1. U D U
2. U2 D

- ◯ True
- ◯ False

Question 8

1 pts

Which of these choices is a valid cycle decomposition of the following permutation?

$\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 3 & 2 & 1 & 5 & 4 \end{pmatrix}$

- ◯ (1 3) (4 5)
- ◯ (1 2 3) (4 5)

- ◯ (1 3 5 4)
- ◯ (3 2 5)

Question 9 — 1 pts

What is the corner/edge parity of the cube after applying the following move to the solved cube?

R

- ◯ Corners are even, edges are even.
- ◯ Corners are odd, edges are odd.
- ◯ Corners are even, edges are odd.
- ◯ Corners are odd, edges are even.

Question 10 — 1 pts

Thanks for taking our class! Please fill out the following feedback form:

https://forms.gle/khNikXLJnhdY63CH6 **(https://forms.gle/khNikXLJnhdY63CH6)**

- ◯ I will fill it out.