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Courses » Groups : Motion, symmetry and puzzles

Announcements **Course** Ask a Question Progress Mentor FAQ

Unit 6 - Week 4 - More applications of groups

Course outline

How to access the portal

Pre-requisite

Week 1- Groups, as they occur naturally

Week 2- Structure of groups

Week 3- Symmetries and GAP exploration

Week 4 - More applications of groups

Representing abstract groups

A quick introduction to group representations

Rotations and quaternions

Rotational symmetries of platonic solids

Finite subgroups of $SO(3)$

Assignment 4

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2018-09-26, 23:59 IST.**

1) Let i, j, k denote elements in Hamilton's quaternions with properties $i^2 = -1, j^2 = -1, ij = -ji = k$. Then the group generated by i has order:

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 4

2 points

2) Let i, j, k denote elements in Hamilton's quaternions with properties $i^2 = -1, j^2 = -1, ij = -ji = k$. Then the group generated by i, j, k has order:

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 8

2 points

3) A non identity diagonal matrix M represents a rotation in three dimensions. Then which of the following is/are correct about M ?

2 points

- trace of M is negative.
- determinant of M is negative.
- M^2 is identity matrix.

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Assignment 4

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trace of M is negative.
 M^2 is identity matrix.
determinant of M is positive.

4) What is/are the correct statement(s) about $SO(3)$? 2 points

- It has finitely many finite subgroups.
 It has infinitely many finite subgroups.
 It has finitely many infinite subgroups.
 It has infinitely many infinite subgroups.

No, the answer is incorrect.

Score: 0

Accepted Answers:

It has infinitely many finite subgroups.
It has infinitely many infinite subgroups.

5) The group $SO(2)$ of rotations in two dimensions is: 2 points

- Abelian
 Non-abelian
 Finite
 Infinite

No, the answer is incorrect.

Score: 0

Accepted Answers:

Abelian
Infinite

6) Number of elements of order 2 in the group of rotational symmetries of a regular tetrahedron is: 1 point

- 3
 4
 6
 8

No, the answer is incorrect.

Score: 0

Accepted Answers:

3

7) How many elements are there in the group of rotational symmetries of an icosahedron?

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 60

2 points

8) Which of the following is/are false about the finite cyclic group of order m ? 2 points

- It is a subgroup of $SO(3)$.
- Its order is equal to the number of its conjugacy classes.
- Its order is a prime number.
- It is a subgroup of S_n , the symmetric group on n symbols, for a suitable $n < m$.
- It is a subgroup of $SO(2)$.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Its order is a prime number.

It is a subgroup of S_n , the symmetric group on n symbols, for a suitable $n < m$

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