MEGL Outreach Spring 2017

Sean Lawton, Jack Love (GMU)

MEGL Outreach Spring 2017

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- Here is an example...

Introduction





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- Over 2,100 students since Summer 2015





A taste of group theory via the symmetries of a square.

Motivation: symmetry in nature

Image: A matrix and a matrix

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Motivation: symmetry in nature



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Motivation: symmetry in nature



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Motivation: symmetry in nature



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Motivation: symmetry in nature



Students make snowflakes, then see how many different ways they can land on a square gameboard.



We give them names based on motions



We say what it means to add symmetries



We give them Cayley tables to complete



And words to simplify

$H + R_{90} + D_1 - R_{270} + D_2 - V =$ $R_{180} - D_2 + R_0 + V + H - R_{90} =$

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 D_4

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ℤ closure√ D₄ closure√

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Image: A matched black

ℤ closure√ identity : 0 D₄ closure√ identity : R₀

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 $\begin{array}{c} \mathbb{Z} & D_{4} \\ closure \checkmark & closure \checkmark \\ identity: 0 & identity: R_{0} \\ inverses: 7 + (-7) = 0 & inverses: R_{90} + R_{270} = R_{0} \end{array}$

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• Extensions of Snowflake Symmetry

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- Extensions of Snowflake Symmetry
 - D_4 as a subgroup of S_4

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 - Others?

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 - D_4 as a subgroup of S_4
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• Extension of Really BIG Numbers



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• MEGL in San Francisco

- Extensions of Snowflake Symmetry
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- MEGL in San Francisco
 - Snowflake Symmetry and Really BIG Numbers adapted for San Francisco Math Circle Math Camp, June 2017

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In closing...

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Thank you to all of the MEGL volunteers that have helped us this semester!

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And thank you for listening!

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