Notice of the Final Oral Examination
for the Degree of Master of Science

of

FELICIA HALLIDAY

BSc (Dalhousie University, 2017)

“Cops, Robbers and Pre-Calculus Skills”

Department of Mathematics and Statistics

Friday, December 13, 2019
10:30 A.M.
David Strong Building
Room C114

Supervisory Committee:
Dr. Jane Butterfield, Department of Mathematics and Statistics, University of Victoria (Co-Supervisor)
Dr. Gary MacGillivray, Department of Mathematics and Statistics, UVic (Co-Supervisor)

External Examiner:
Dr. Celina Berg, Department of Computer Science, UVic

Chair of Oral Examination:
Dr. Michael Masson, Department of Psychology, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies
Abstract

This thesis is partitioned into three parts: improving pre-calculus skills of students in an introductory calculus course, the game of Cops and Robber on oriented graphs, and the generalized game of Cops and Robber. In the first part, we study the effect of review modules on student performance using an Educational Action Research framework. In addition to the study, we report what instructors at various institutions say they were doing to improve pre-calculus skills. In the second part, we introduce the game of Cops and Robber on oriented graphs using a two-part article that will appear in the problem-solving journal for high school students and undergraduates, Crux Mathematicorum. Next, we present a survey of previous results and provide family of counter examples to a conjecture that was recently shown to be false. In the last part of the thesis, we consider general Cops and Robber games. We give a survey of previous results and conclude with a new characterization of graphs in which the Cops have a winning strategy.