CORNERSTONE CHRISTIAN COLLEGE
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Name: _____
Class: _____
Due date: _____Thursday_ 7 / 5 / 15
Mark: _____

Year 10 Mathematics 2015. Topic 2, Geometry Investigation
"Similarities"

Draw a quadrilateral and select any point x in the plane. Draw line segments from x to the vertices of the quadrilateral. Join, in order, the mid-points of these line segments. Investigate.[1]

Content Strands to be Assessed:
Formulate proofs involving congruent triangles and angle properties (ACMMG243) (applying an understanding of relationships to deduce properties of geometric figures (for example the base angles of an isosceles triangle are equal))

Apply logical reasoning, including the use of congruence and similarity, to proofs and numerical exercises involving plane shapes (ACMMG244) (distinguishing between a practical demonstration and a proof (for example demonstrating triangles are congruent by placing them on top of each other, as compared to using congruence tests to establish that triangles are congruent) (performing a sequence of steps to determine an unknown angle giving a justification in moving from one step to the next. communicating a proof using a sequence of logically connected statements)

Advice for students:

1. The booklet is provided for you to show your ideas, working, sketches, number and algebra. Use it to show all the work you do, but try to keep the first page (inside front cover) for jotting down ideas, and the last page for your conclusions or summary. If you run out of room, feel free to carefully add on more pages. Additional booklets can be provided at no extra cost!
2. Starting out.
    a. Getting started is half the battle. Don't leave it too late.
    b. Sketch out a few ideas; don't try to be too systematic early on, just get a feel for the problem. If you generate lots of sketches or repetitive calculations (which would be good) tuck them into the appropriate page of the booklet and staple them onto that page.
3. Thinking.
    a. Leave space on the inside cover to write down ideas that you have as you have them. You may want to come back to them later.
    b. Don't get frustrated if one idea does not work – try something else.
    c. Sleeping on a problem really works. Stop, take a break, and come back to it again.
4. Systematic exploration.
    a. First try a very simple case, then build up systematically to more difficult cases.
    b. Keep track of your work - be organised.
    c. Some ideas will be dead ends, some will lead to infinite possibilities.
    d. Be prepared for lots of hackwork early on. Sometimes pages of work can be summarised later with one general statement.
    e. Use the investigation statement as a starting point. Do not feel constrained by the statement – use it as a launching pad for ideas. Go both in-depth into the statement and extend beyond the statement.
5. Sometimes (not always) systematic exploration may permit you to make a conjecture about patterns or relationships. A conjecture is "*an opinion or conclusion formed on the basis of incomplete information*"[2]. Test any conjectures or ideas, proving if you are able.
6. This is an individual assignment. The expectation is that the work submitted is wholly your own.

Marking.
Unlike most mathematics assessments this investigation is open-ended with no one-line "right" answer. There is no rigid marking key or rubric. Marking will be based more on an overall impression of the work than a standard test would be. You will be assessed on mathematical thinking rather than rote learning. There may well be a relationship that you would be expected to deduce or arrive at, but a lot of consideration will be given to:

1. The range of problems investigated (but one problem investigated in-depth could counter this!)
2. The depth of problems investigated (but investigating several problems could counter this!)
3. The manner in which the investigation has been carried out systematically.
4. The mathematical content, including the application of previously studied material & new work.
5. The quality of any summary (organisation, structure, fluency, clarity, presentation)

[1] B Bestow, J Hughes, B Kissane, R Mortlock, 40 Mathematical Investigations, Subiaco, The Mathematical Association of Western Australia, Undated.
[2] http://www.oxforddictionaries.com/definition/english/conjecture sourced 26/3/14.