



HAWKER COLLEGE

Faculty 42 Assignment Cover Sheet

This sheet should be attached to the front of your assessment item.

Read it carefully, complete the appropriate details, and sign it.

Course: Specialist Mathematics Unit: Vectors and Complex Numbers SME3	Assessment Item Weighting: 25%
Teacher: Erin	Class: 929T2S1
Assignment Topic: Vectors	Due Date: 15 th March 2013
Student Name:	Student ID:

I certify that:

- a) no part of this work has been copied from any other person's work, except where due acknowledgement has been made (including material from the internet, videos, DVDs and personal interviews);
- b) this submission is based on my own research;
- c) this piece of work has not been submitted for assessment in this or any other course.

In accordance with Hawker College and BSSS policies, I understand that:

- a) plagiarism is a serious matter and that I may be called on to validate my information by other means (such as an oral test) if necessary – and I could be penalised if this declaration is false;
- b) work submitted after the due date may be penalised and that I must apply for any extension prior to the due date; and
- c) I have the right to appeal the assigned mark/grade.

Students Certification	Student Signature	Date:
Teacher Receipt	Received by Teacher Signature	Date and Time:

Request for Extension (To be completed by the Mathematics Executive Teacher) Date: Granted: Y N Signature	This assignment is now due on:
--	---

Receipt of Assignment

[Student to complete all details except Teacher's Signature, Date Received and Time Received, then remove and keep as proof of submission after teacher has signed]

Student name:		Received by (Teacher name):	Erin
Course:	SME3	Teacher signature:	
Assignment name:	Vectors	Time and Date received:	

Jumping Vector Game

Consider a game involving 3 points A, B and C and an initial point P_0 on the Cartesian plane.

The game works as follows:

1st Move : Starting at P_0 , move in a straight line through point A, and continue until you have moved the same distance past A, as you moved to get to A. (we will call this a scalar multiple of 1) The point you end up at is called P_1 .

2nd Move: Starting at P_1 , move in a straight line through the next point, point B, and continue until you have moved the same distance past B, as you moved to get to B. This point you end up at is called P_2 .

3rd Move: Starting at P_2 , move in a straight line through the next point, point C, and continue until you have moved the same distance past C, as you moved to get to C. This point you end up at is called P_3 .

4th move and more: Back to A in the same manner and so on.

Question1:

Pick 4 points A, B, C and P_0 .

Play this game with your points.

Demonstrate mathematically (including calculation of distances and new points) and also geometrically.

Continue for several more moves than just the 4 moves that are explained above.

Question2:

What interesting thing did you notice, and after how many moves did this happen?

Question3:

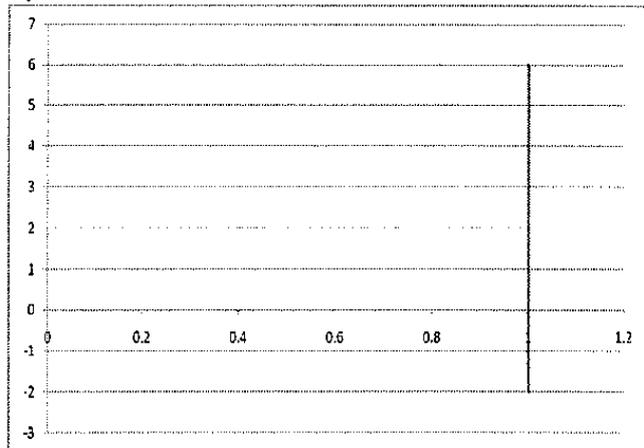
Now generalise this game for any point A (A_x, A_y), point B (B_x, B_y), point C (C_x, C_y) and point P_0 (P_{0x}, P_{0y}). The answer to this question should entail generic algebraic mathematical working.

Hence explain why the interesting thing happened in Question 2.

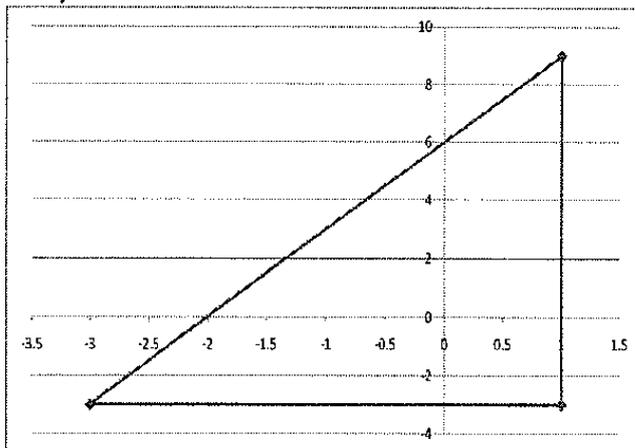
Question4:

The following images represent the patterns created, using 3 points A, B and C and an initial point P₀. Investigate these images. Explain where you think the points A, B, C and P₀ were located to have generated these images.

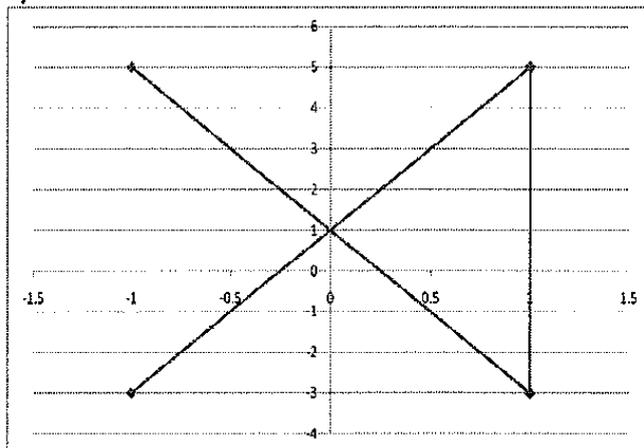
a)



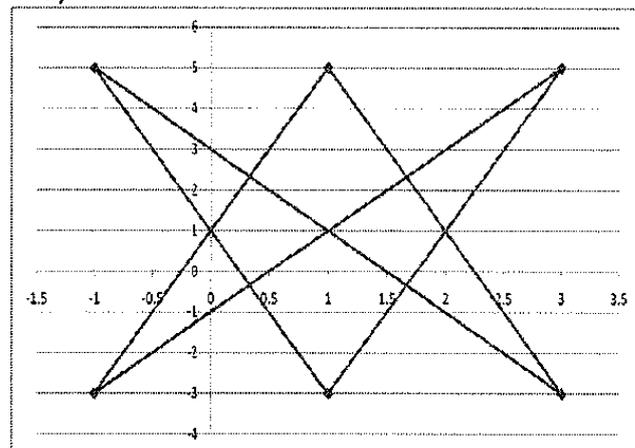
b)



c)



d)



Question5:

Now it's time to consider what happens if we have more than 3 points. Investigate what happens when this game is played with 4, 5, 6, and 7 points. In your investigation communicate clearly what your trialling, how you are investigating it. Use some software like Geogebra here and include screen shots, files, printouts, or photographs in your assignment to verify the investigation you have carried out.

Question6:

Now investigate if we get a similar result by moving a different scalar multiple amount past the point than just 1 that was originally used, (for example a scalar of 2, would mean you move twice as far past A as you moved to get to A). Consider a larger whole number (>1) and a fractional scalar multiple (<1). In your investigation communicate clearly what your trialling, how you are investigating it. The use of software or other is encouraged here. Use some software like Geogebra here and include screen shots, files, printouts, or photographs in your assignment to verify the investigation you have carried out. Be clear how many points you are using in your investigation with and why you chosen this.

Question7:

Extend the game now to 3D..... (There is a BETA version for Geogebra in 3D!!) Does it still work? Is the mathematics same or different? Demonstrate and show or explain your thinking. The answer to this question should include a mathematical algebraic proof and a physical or geometrical picture.

MARKING RUBRIC

	Strong	Good	Mod	Fair	Poor											
Mathematical Knowledge <ul style="list-style-type: none"> • Demonstrates very high level of proficiency in the use of facts, techniques and formulae. • Mathematics used throughout is of very high standard and mathematically correct. • Notation is correct • Use of Vector properties and formulae correct. 	40	36	33	30	27	24	22	20	18	16	13	10	7	4	0	Mathematical Knowledge <ul style="list-style-type: none"> • Demonstrates very limited use of the facts, techniques and formulae studied.
Application <ul style="list-style-type: none"> • Selects, extends and applies appropriate modelling and problem solving techniques. • Generalised mathematics is applied correctly • Investigations show use of appropriate mathematics and problem solving skills. 	40	36	33	30	27	24	22	20	18	16	13	10	7	4	0	Application <ul style="list-style-type: none"> • Solves some problems with guidance.
Reasoning and Communication <ul style="list-style-type: none"> • Uses mathematical reasoning to develop logical arguments in support of conclusions, results and/or decisions; justifies procedures. • Is consistently accurate and appropriate in presentation of mathematical ideas in different contexts. • All mathematics clearly articulated. • Discussions and investigations are easy to follow and developed by the use of logical arguments. 	40	36	33	30	27	24	22	20	18	16	13	10	7	4	0	Reasoning and Communication <ul style="list-style-type: none"> • Uses limited reasoning to justify conclusions. • Presents some mathematical ideas with guidance.

SELF EVALUATION

Please indicate below how you have marked yourself according to the rubric above, write in how many marks you considered your assignment to be worth in each of the three areas, (this shows that you have reflected on your work and considered if you have met all the given criteria).

Mathematical Knowledge	
Application	
Reasoning and Communication	
TOTAL	/120

Please also write a brief comment around something you have learnt from this assignment:

.....

