THE ERINDALE ACADEMY

COURSE NAME: MPM2D – Principles of Mathematics

Unit 2 – Analytic Geometry
(Assignment #6: Advanced Shapes: (Parallelograms and Triangles)
2.1 to 2.7)

Teacher: Antonio Pietrangelo

Time: as needed.

Pages: 10

Student's Name:
Student#:

Due Date: Friday, January 26th, 2024 @ 23:59pm (EST)

Mark: /100

Categories	Knowledge/ Understanding	Thinking/Inquiry/ Problem Solving	Communication	Application
Symbol	K/U	T/I	C	A
Weight	25 %	25 %	25 %	25 %
Level				

Overall Expectations:

All Overall Expectations as listed in the Ontario Curriculum course outline for your specific course.

Overall Expectations:

2. Analytic Geometry: Line Segments and Circles, Other Shapes (Parallelogram and Triangles)

Specific Expectations:

2.1 Midpoint of a Line Segment
2.2 Length of a Line Segment
2.3 Equation of a Circle
2.4 Classifying Figures on a Coordinate Grid
2.5 Verifying Properties of Geometric Figures (Right Bisector of a Triangle, etc.)
2.6 Exploring Properties of Geometric Figures (Centroid of Triangle, etc.)
2.7 Using Coordinates to Solve Problems

THE ERINDALE ACADEMY

Key Terms:

1. Slopes of Lines
2. Parallel lines
3. Perpendicular bisector
4. Length of Line Segment
5. Length of a hypotenuse
6. Pythagorean Theorem
7. Equation of a circle
8. Point on a circle
9. Median of a Triangle
10. Equidistance
11. Cartesian Grid
12. Midpoint
13. Altitude
14. Radius of a Circle
15. Fractal
16. centroid
17. Parallelogram
18. Varignon Parallelogram
19. Right-angle Triangle
20. Isosceles Triangle
21. Scalene Triangle
22. Equilateral Triangle

Rubrics:

Category	Level R (0 – 49%)	Level 1 (50-59%)	Level 2 (60-69%)	Level 3 (70-79%)	Level 4 (80-100%)	Level/ Mark
Knowledge – Understanding of: **(Unit/Section - 2.1 to 2.7)**	demonstrates insufficient understanding	demonstrates limited understanding	demonstrates some understanding	demonstrates considerable understanding	demonstrates thorough understanding	
					Individual Mark	___

Category	Level R (0 – 49%)	Level 1 (50-59%)	Level 2 (60-69%)	Level 3 (70-79%)	Level 4 (80-100%)	Level/ Mark
Thinking and Inquiry (What if scenarios) of **(Unit/Section - 2.1 to 2.7)**	demonstrates insufficient ability to apply different scenarios	demonstrates limited ability to apply different scenarios	demonstrates some ability to apply different scenarios	demonstrates considerable ability to apply different scenarios	demonstrates through ability to apply different scenarios	
					Individual Mark	_____

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Category	Level R (0 – 49%	Level 1 (50-59%)	Level 2 (60-69%)	Level 3 (70-79%)	Level 4 (80-100%)	Level/ Mark
Communication **Communicates effectively with the use of (Unit/Section: 2.1 to 2.7)**	demonstrates **insufficient** ability to communicate effectively	demonstrates **limited** ability to communicate effectively	demonstrates **some** ability to communicate effectively	demonstrates **considerable** ability to communicate effectively	demonstrates **through** ability to communicate effectively	
					Individual Mark	_____

Category	Level R (0 – 49%	Level 1 (50-59%)	Level 2 (60-69%)	Level 3 (70-79%)	Level 4 (80-100%)	Level/ Mark
Application: Demonstrates the ability to implement mathematical modules in real world applications: **(Unit/Section : 2.1 to 2.7)**	demonstrates **insufficient ability**	demonstrates **limited ability**	demonstrates **some ability**	demonstrates **considerable ability**	demonstrates **thorough ability**	
					Individual:	_____

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PART A: KNOWLEDGE AND UNDERSTANDING (K/U) – 25%

2 Marks Per Question

Instructions:

Question 1: A triangle that has a 90° angle is considered a right-angle Triangle? (True or False)

Question 2: A trapezoid is not a parallelogram? (True or False)

Question 3: A parallelogram has two pairs of sides that are parallel in to each other? (True or False)

Question 4: The equation of a circle is $x^2 + y^2 = 81$. Does point(0, -10) is outside the circle? (True or False)

Question 5: The centroid of a triangle divides all 3 medians of a triangle by a ratio of 3:1? (True or False)

PART B: THINKING AND INQUIRY (T/I) – 25 %

5 Marks Per Question

Show your work:

Use Desmos graphing software to plot the points and join the points using polygon(O, Q, P) statement. Points are: O(0, 0), Q(4, 4), and C(8, -4).

Question 1: Find the midpoint of the line segments that joins these points

Question 2: Find the length of each line segment joining the same points above

PART C: COMMUNICATION (C) – 25%

10 Marks Per Question

Using the same points as in PART B, above: O(0, 0), Q(4, 4), and C(8, -4).

Question 1: Verify that point C(4, 0) is the centroid to of triangle ΔOQP.

Hint: A centroid of a triangle is the point of intersection of the three medians of a triangle.

Student Response:

PART D: APPLICATION (A) – 25%

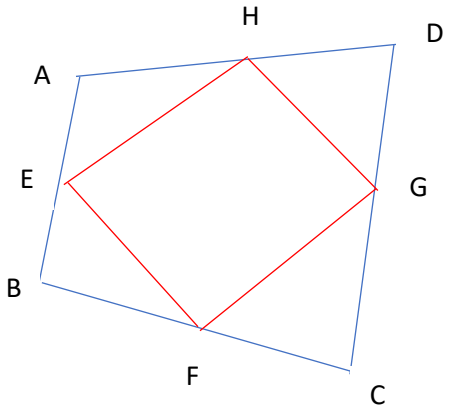
10 Marks Per Question

Question 1:

Proof of a parallelogram, Varignon parallelogram:
Inside any random 4-sided polygon, i.e. a quadrilateral, where their midpoints of any 4-side polygon, when connected produce a parallelogram.

Follow the steps below per students randomly assigned points for A, B, C, D and follow the steps in the tables below. Please come up with a conclusion, and also verify another student's calculations along with your calculations.

What conclusion or observation have you made?



Step 1: Table of Points:

Student Name	Point A	Point B	Point C	Point D
Sandy	(-8,4)	(-8,-8)	(5,-4)	(9,8)
Qian	(-10, 10)	(-10, -5)	(10, -10)	(5, 10)

Linna	(-5, 5)	(0, -10)	(10, -5)	(15, 10)
Alex	(-10, 15)	(-10, -5)	(5, -5)	(6, 12)
Steven	(-9, 6)	(-7, -10)	(12, -11)	(9, 5)
Kevin	(-3, 1)	(-2, -4)	(2, -3)	(3, 4)

Step 2: Table of MidPoints:

Student Name	MidPoint E(X,Y) is for AB	MidPoint F(X,Y) is for BC	MidPoint G(X,Y) is for CD	MidPoint H(X,Y) is for DA	Verified by
Sandy					Qian
Qian					Linna
Linna					Alex
Alex					Steven
Steven					Kevin
Kevin					Sandy

Step 3: Table of Lengths:

Student Name	Length Of (AE, BE)	Length Of (BF, CF)	Length Of (CG, DG)	Length Of (AH, DH)	Verified by (V1)
Sandy					Qian
Qian					Linna
Linna					Alex
Alex					Steven
Steven					Kevin
Kevin					Sandy

Step 4 & 5: Table of Slopes:

Student Name	Slopes (M) EH, FG	Slopes(M) EF, HG	—— Verified by
Sandy			Qian
Qian			Linna
Linna			Alex
Alex			Steven
Steven			Kevin
Kevin			Sandy

You Conclusion or Observation place here: