P425/1

PURE MATHEMATICS

PAPER 1

JULY 2017

3 HOURS

ST. JOSEPH OF NAZARETH HIGH SCHOOL

UGANDA ADVANCED CERTIFICATE OF EDUCATION

INTERNAL MOCK EXAMINATION 2017

PURE MATHEMATICS

PAPER 1

3 HOURS

**INSTRUCTIONS:**

* Answer all the questions in Section A and only five questions in Section B.
* Show all necessary working clearly.
* Silent, non-programmable scientific calculators and mathematical tables with a list of formula may be used.

**SECTION A (40 MARKS)**

**Attempt all questions from this section.**

1. If Find the values of and . (5 marks)
2. The ninth term of an arithmetic progression is twice the third term, and the fifteenth term is 27. Evaluate the sum of the first 25 terms of the series. (5 marks)
3. Differentiate with respect to (5 marks)
4. Evaluate the definite integral (5 marks)
5. Solve the equation for . (5 marks)
6. Find the equation of the circle which touches the line at the point

and passes through the point (5 marks)

1. The roots of the equation are and . Given that

find the possible values of . (5 marks)

1. Prove that . Hence solve the equation

(5 marks)

**SECTION A (60 MARKS)**

**Answer any five questions from this section.**

1. (a) If determine the Cartesian equation of the locus given by

(6 marks)

(b) Sketch the loci defined by the equations:

(i)

(ii)

(6 marks)

1. (a) Prove that (6 marks)

(b) Solve the equation (6 marks)

1. Find the coordinates of any maxima, minima and points of inflexion of the

function that it may have. Hence sketch the curve

(12 marks)

1. (a) Find

(b) Express (9 marks)

1. (a) Find the particular solution of the differential equation

Given that when (6 marks)

(b) A lump of radioactive substance is disintegrating. At time days after it was

first observed to have the mass of 10 grams and where is a

constant.Find the time, in days for the substance to reduce to 1 gram in mass,

given that its half –life is 10 days. (The half – life is the time in which half of any

mass of the substance will decay.) (6 marks)

1. (a) Find the values of for which the line is a tangent to the circle (3 marks)

(b) Find the points where the line meets the circle

Obtain the equation of the tangents and normal

to the circle at these points(6 marks)

1. (a) Show that the points A,B and C with position vectors

respectively are the vertices of a triangle. Find the area of the triangle.

(5 marks)

(b) Find a vector perpendicular to the vectors and

Hence, find the equation of a plane passing through the point and

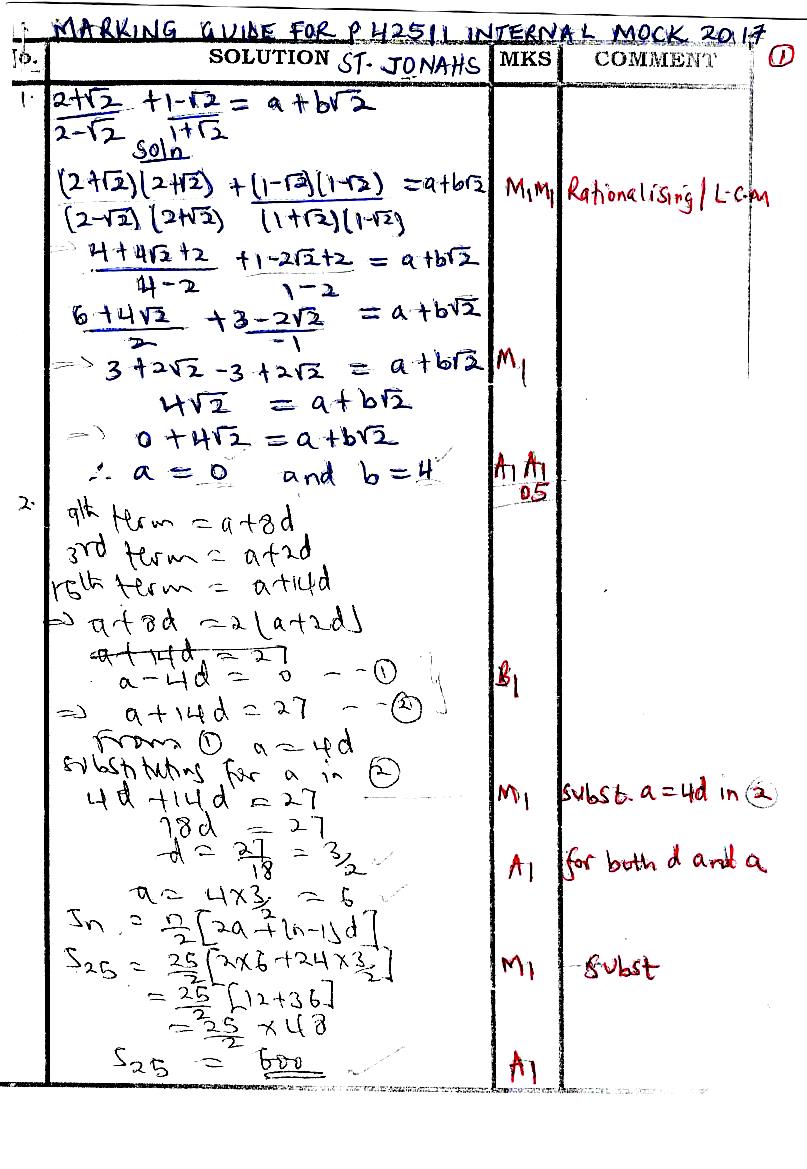
parallel to and . Find the angle between the plane and the line

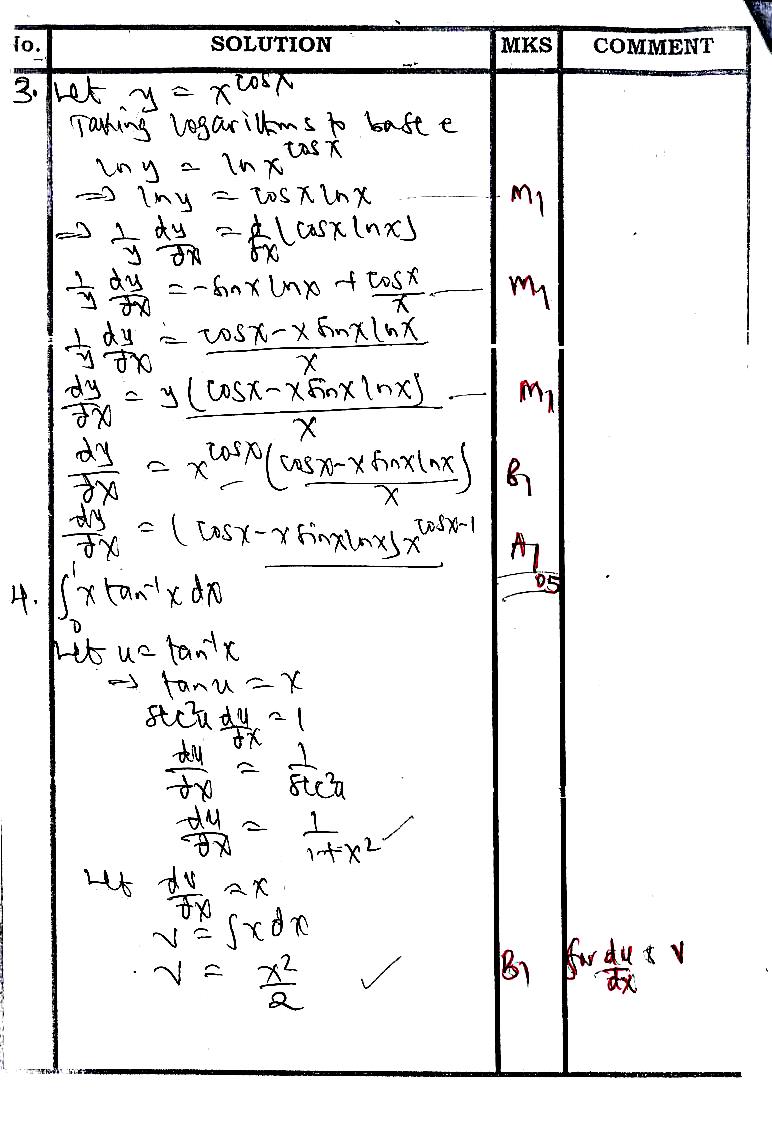
(7 marks)

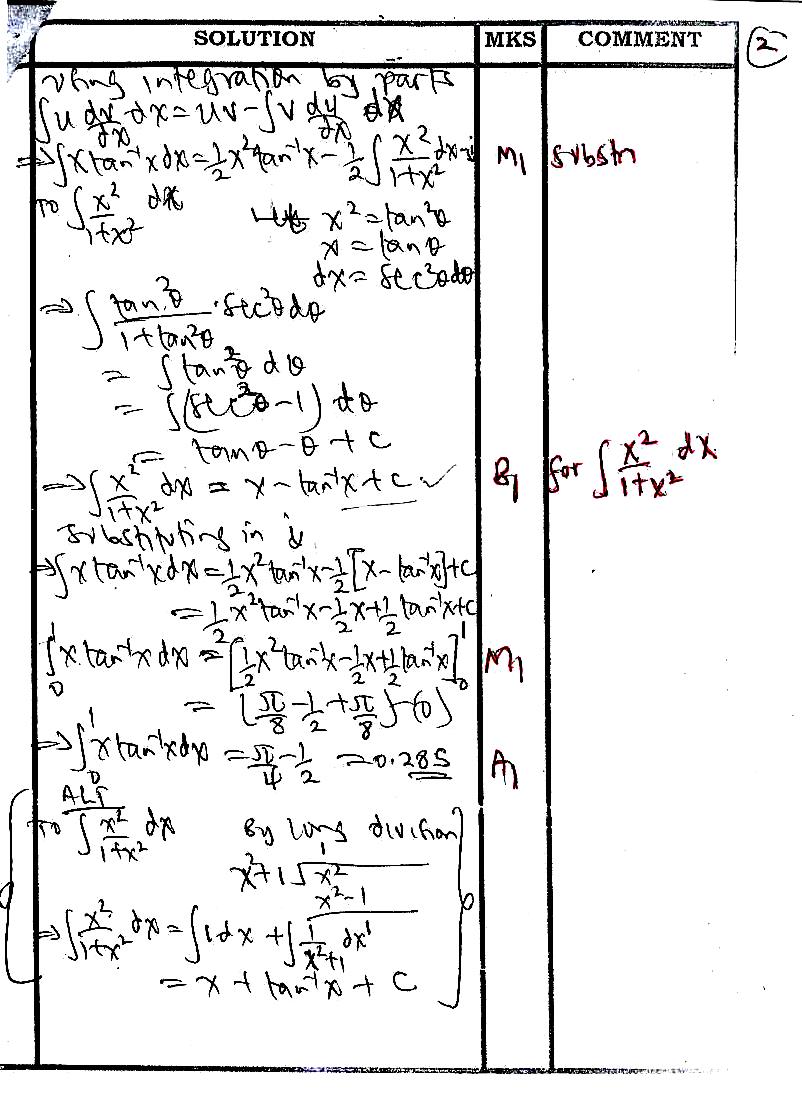
1. (a) If show that (6 marks)

(b) Use the Maclaurin’s theorem to find the first four terms of the expansion of . (6 marks)

**~END~**

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