**Name**……………………………………………………….Index No:…………….……………...

School………………………………………….…Candidate’s Signature …………..…………….

121/1

**MATHEMATICS**

PAPER 1

MAY/JUNE 2016

**Time: 2 ½ Hours**

**EKSIKA JOINT EVALUATION TEST**

***Kenya Certificate of Secondary Education (K.C.S.E.)***

**Mathematics**

PAPER 1

**Time: 2 ½ Hours**

**INSTRUCTIONS TO CANDIDATES**

* Write your **name** and **index number** in the spaces provided at the top of the page.
* The paper contains two sections; section I and II.
* Answer ***all*** the questions in section I and only five questions from section II.
* All answers and working **must** be written on the question paper in the spaces provided below each question.
* Non- programmable silent electronic calculators and **KNEC** mathematical tables may be used **except** where stated otherwise.
* Marks may be given for correct working even if the answer is wrong.

**For Examiners Use Only**

**SECTION I**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Marks |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**SECTION II**

GRAND TOTAL

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Question | 19 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| Marks |  |  |  |  |  |  |  |  |

*This paper consists of 16 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.*

1. Use mathematical table to evaluate (4mks)

2.935x0.0765

32.74

1. The interior angle of a regular polygon is 4 times the exterior angle. How many sides does the polygon have? (3mks)
2. Mr. Makasembo has a triangular plot that measure 170m, 190m and 210m. find the area of this plot in hectares (3mks)
3. Simplify completely the expression 3mks

15x2+xy-6y2

5x2-8xy+3y2

1. In Abwao mixed secondary school, 3/10 of the students are boys. On a certain day, 1/6 of the boys were absent and 2/5 of the girls were absent, find the number of students in the school 3mks

1. Use tables of reciprocals only to work out 3mks

+

1. Express - = in the form of ax2 +bx+c=0. Where a, b and c are constants hence solve for x 4mks

+

3

0.6735

13

0.156

1. Two similar solids have masses of 80 kg and 270 kg respectively. Find the surface area of the larger solid if the smaller solid has a surface area of 48cm3 3mks
2. A Kenyan bank buys and sells foreign currencies using the rates shown below;

Buying selling

(ksh) (ksh)

1Euro 86.25 86.97

100 Japanese yen 66.51 67.26

A Japanese travelling from France arrives in Kenya with 5000 Euros, which he converts to Kenyan shillings at the bank .while in Kenya he spent a total of ksh 289,850 and then converted the remaining Kenyan shillings to Japanese Yen at the bank. Calculate the amount of Japanese Yen that he received 3mks

1. Three liters of water (density 1g/cm3 ) is added to twelve liters of alcohol (density 0.8g/ cm3 ).. what is the density of the mixture 3mks
2. The angle of elevation of the top of a cliff from point P is 45°. From a point Q which is 10m from P towards the foot of the cliff, the angle of elevation is 48°. Calculate the height of the cliff. 4mks

1. Given that P=3r, express the equation 32r-1+2x3r-1=1 in terms of P. hence find the value of r in the equation

32r-1+2x3r-1=1 4mks

1. A trader sells a bag of beans for ksh 2,100 and that of maize at ksh.1,200. He mixed maize and beans in the ratio of 3:2. Find how much the trader should sell a bag of the mixture to realize the same profit 3mks
2. Find the area of the circle in the diagram below 4mks

C

B

A

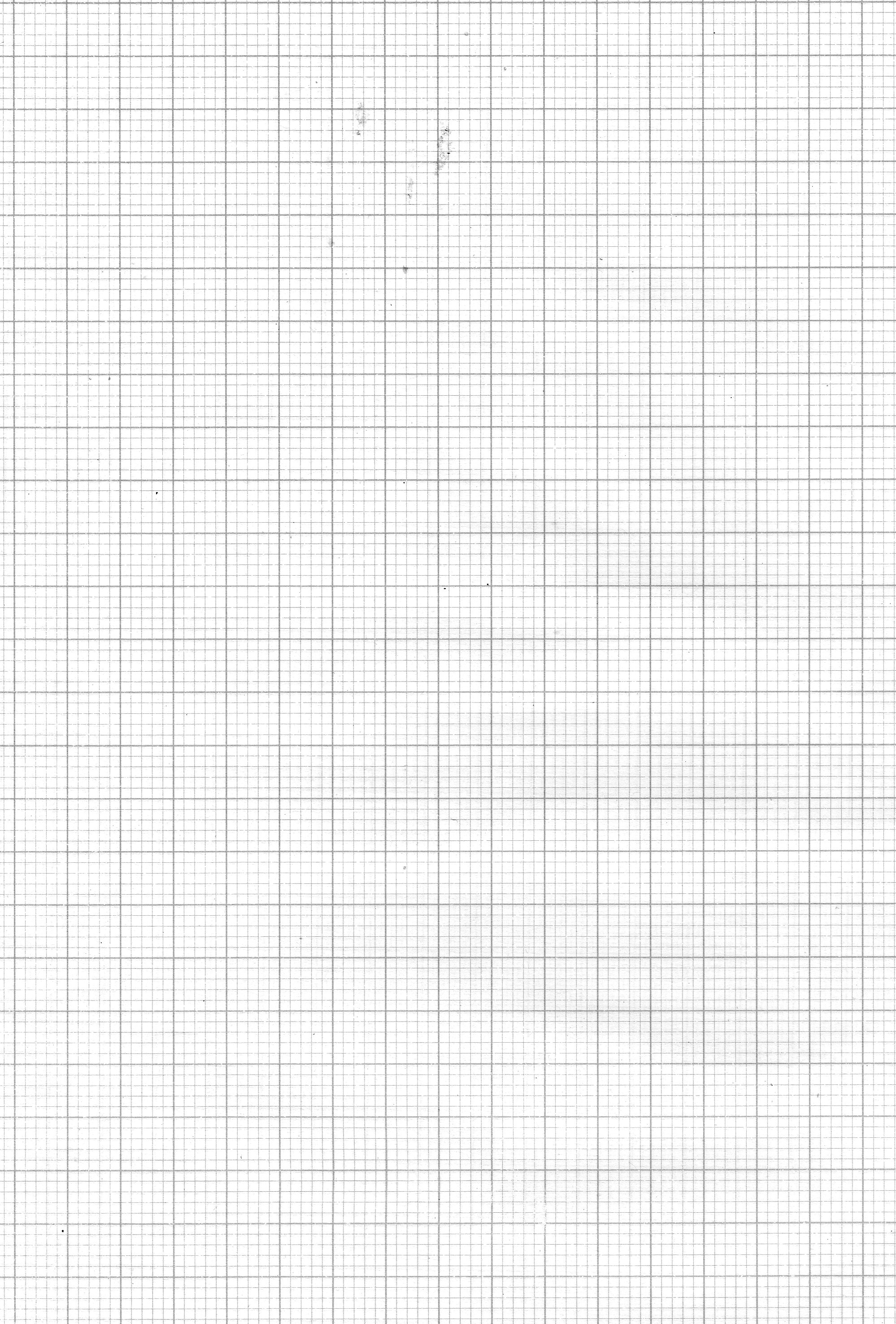
48°

24cm

1. Draw a line AB of length 9cm. on one side of the line AB construct the Locus of a point P such that the area of triangle APB is 13.5 cm2. On this Locus locate two positions of P, P1 and P2 such that angle AP1B= angle AP2B=90° 4mks
2. The frequency distribution table below shows the weekly salary (k£) paid to workers in a factory

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Salary | 50≤X<100 | 100≤X<150 | 150≤x< 250 | 250≤x<350 | 350≤x<500 |
| No. of workers | 13 | 16 | 38 | 24 | 9 |

On the grid provided draw a histogram to represent the information shown above 4mks



**SECTION II (50 MARKS)**

**Answer any five questions in this section**

1. In the figure below PQR is tangent to the circle at Q and the angle PQS=28° and angle UTQ=54° and UT=TQ

O

S

R

28°

Q

54°

T

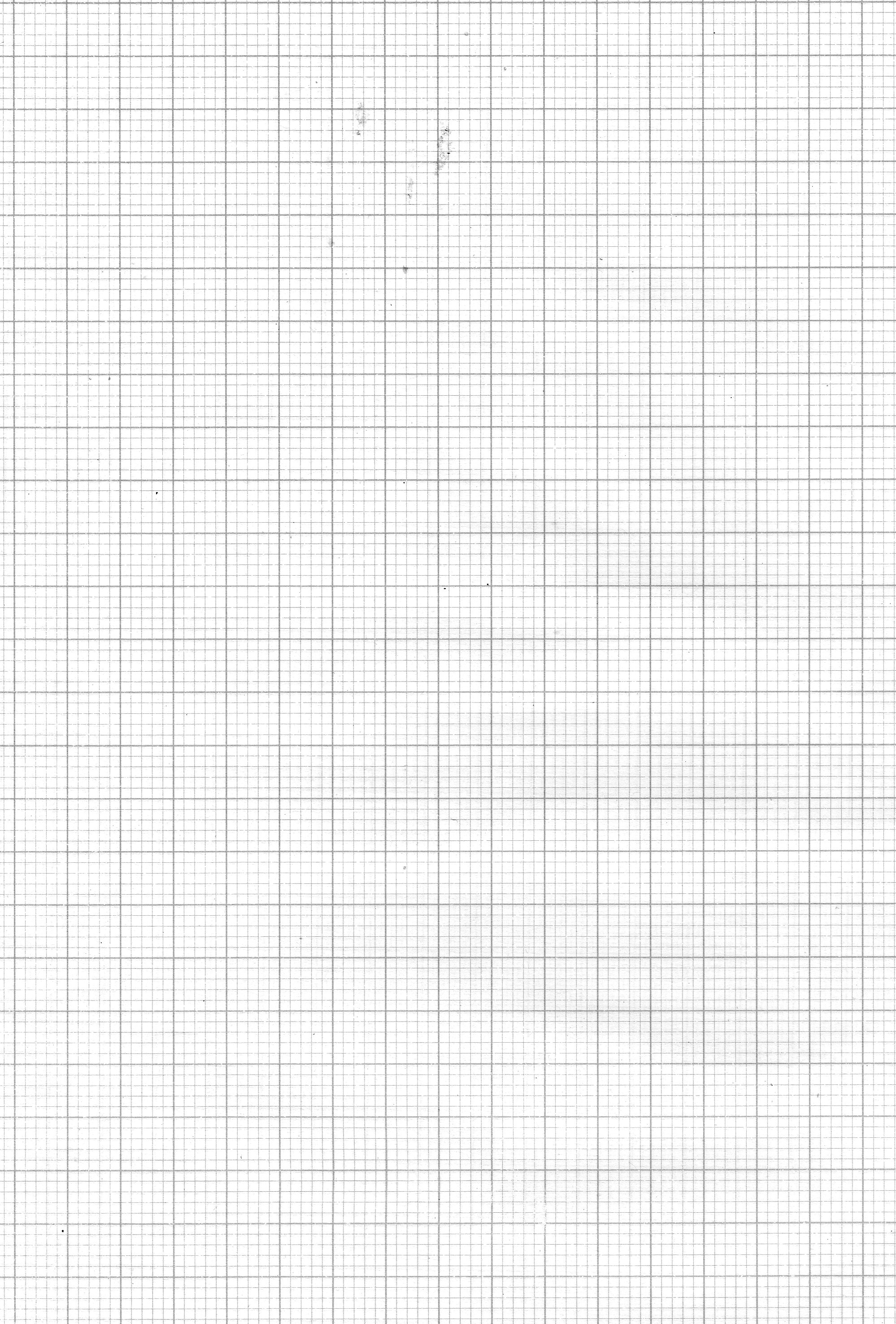
U

P

Stating reasons, determine the values of angles named below

1. ےSTQ 2mks
2. ےTQU 2mks
3. ےTQS 2mks
4. Reflect angle UOQ 2mks
5. ےTQR 2mks
6. A car accelerates from rest for 10 seconds until it reaches a velocity of 12ms-1. It then continues at this velocity for the next 40 seconds after which it brakes and comes to rest at a constant retardation of 1.5ms-2. Determine
7. The acceleration over the first 10 seconds 2mks
8. The time taken during retardation 2mks

b) draw the velocity time graph for the journey 2mks



c) Use the graph above to determine;

i) The total distance covered by the car 2mks

ii) The percentage of the total distance which was covered during the first 15 seconds 2mks

1. Given the simultaneous equations

5x+y=19

-x+3y=9

1. Write the equations in matrix form. Hence solve the simultaneous equations by matrix method 5mks
2. Find the distance of the point of intersection of a line 5x+y=19 and –x+3=9 from the point (11,-2) 2mks
3. Determine the values of x for which the matrix below has no inverse 3mks

2x x2

2 1

1. a) Three points A (0,4) B(2,3) and C(-2,-1) are vertices of a triangle. Find;
2. The gradient of AC 1mk
3. The gradient of the perpendicular bisector of line AC 1mk
4. The coordinates of the mid-point of line AC 1mk

b. i) The gradient of AB 1mk

ii) The gradient of the perpendicular bisector of lines AB 1mk

iii) The coordinates of the mid-point of AB 1mk

c) i. find the equation of the perpendicular bisector of AC 1mk

ii)The equation of perpendicular bisector of AB 1mk

iii) Hence find the coordinates of the circumcentre of the triangle 2mks.

1. The position vectors of points A and B with respect to the origin O, are and

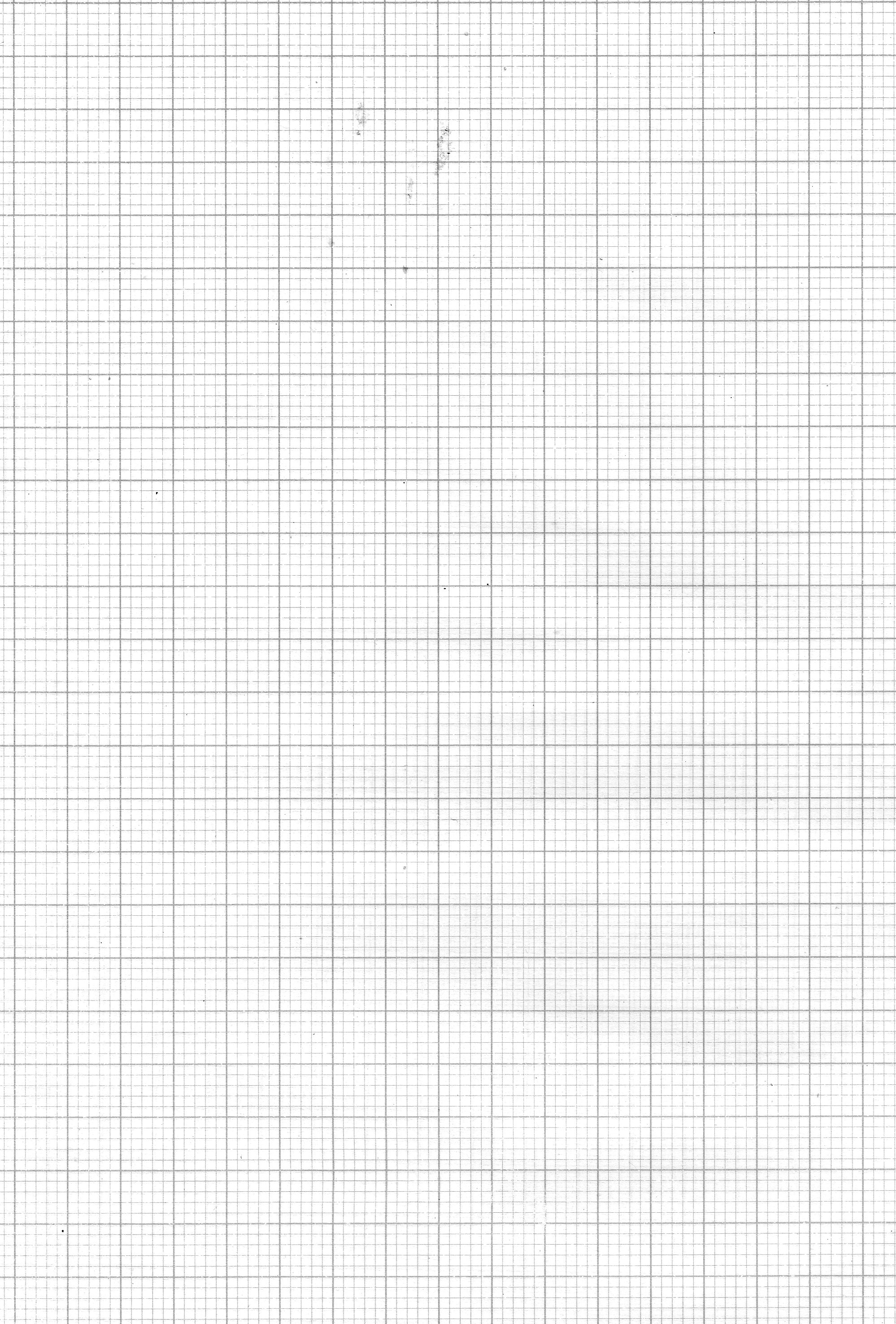
Respectively. Points M and N are the mid points of AB and OA respectively.

1. find
2. The coordinates of N and M 3mks
3. The magnitude of NM 3mks
4. Express vector NM in terms of OB 1mk
5. Point P maps onto P1 by a translation Given that OP=OM+2MN, find the coordinates of P1 3mks
6. A particle moves in a straight line such that after t seconds, its displacement s metres from a fixed point O is given by S=(-4t-2t2+5t3)m
7. Find the velocity at t=3 seconds 3mks
8. Find the instant at which the particle was momentarily at rest 2mks
9. Find the acceleration at time t=2 seconds 3mks
10. Find the displacement of the particle when t= 2 seconds 2mks

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 |
| Y | -26 | -1 |  | 7 |  |  |  | 23 |

1. a) Complete the table below for the equation y=x3-2x2-4x+7 2mks

b) Using the scale 1cm to represent 2units on the x-axis and 1 cm to represent 5 units on the y-axis, draw the graph of y=x3-2x2-4x+7 3mks



c) Use your graph to estimate the roots of the equation x3-2x2-4x+7=0 1mk

d) By drawing appropriate straight lines, use your graph to solve the equations

i) x3-2x2-4x+2=0 2mks

ii) x3-2x2-3x+3=0 2mks

1. The diagram below represents a conical vessel which stands vertically. The vessel contains water to a depth of 30 cm. the radius of the water surface in the vessel is 21cm ( take π= 22/7)

21cm

30cm

1. calculate the volume of the water in the vessel in cm3 2mks
2. when a metal sphere is completely submerged in the water, the level of the water in the vessel rises by 6cm. calculate
3. the radius of the new water surface in the vessel 2mks
4. the volume of the metal sphere in cm3 3mks
5. the radius of the sphere 3mks