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

Candidate’s Signature ………………………….

Date: ………………………………...

121/1

**MATHEMATICS**

Paper 2

**JULY/AUGUST 2014**

**Time: 21/2 Hours**

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

**121/2**

**MATHEMATICS**

Paper 2

**INSTRUCTIONS TO THE CANDIDATES**

* *Write* ***your name*** *and* ***index number*** *in the spaces provided above*
* *This paper contains two sections;* ***Section*** *1 and* ***Section 11****.*
* *Answer all the questions in* ***section 1*** *and only* ***five*** *questions from* ***Section 11***
* *All workings and answers must be written on the question paper in the spaces provided below each question.*
* *Marks may be given for correct working* ***even if*** *the answer is wrong.*
* *Calculations and KNEC Mathematical tables may be used* ***EXCEP****T where stated otherwise.*
* *Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.*

**FOR EXAMINERS’S USE ONLY**

**Section 1**

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

**Section 1I** **GRAND TOTAL**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Question | 17 | 18 | 19 | 20 | 21 | 22 | 13 | 24 | **Total** |
| Marks |  |  |  |  |  |  |  |  |  |

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

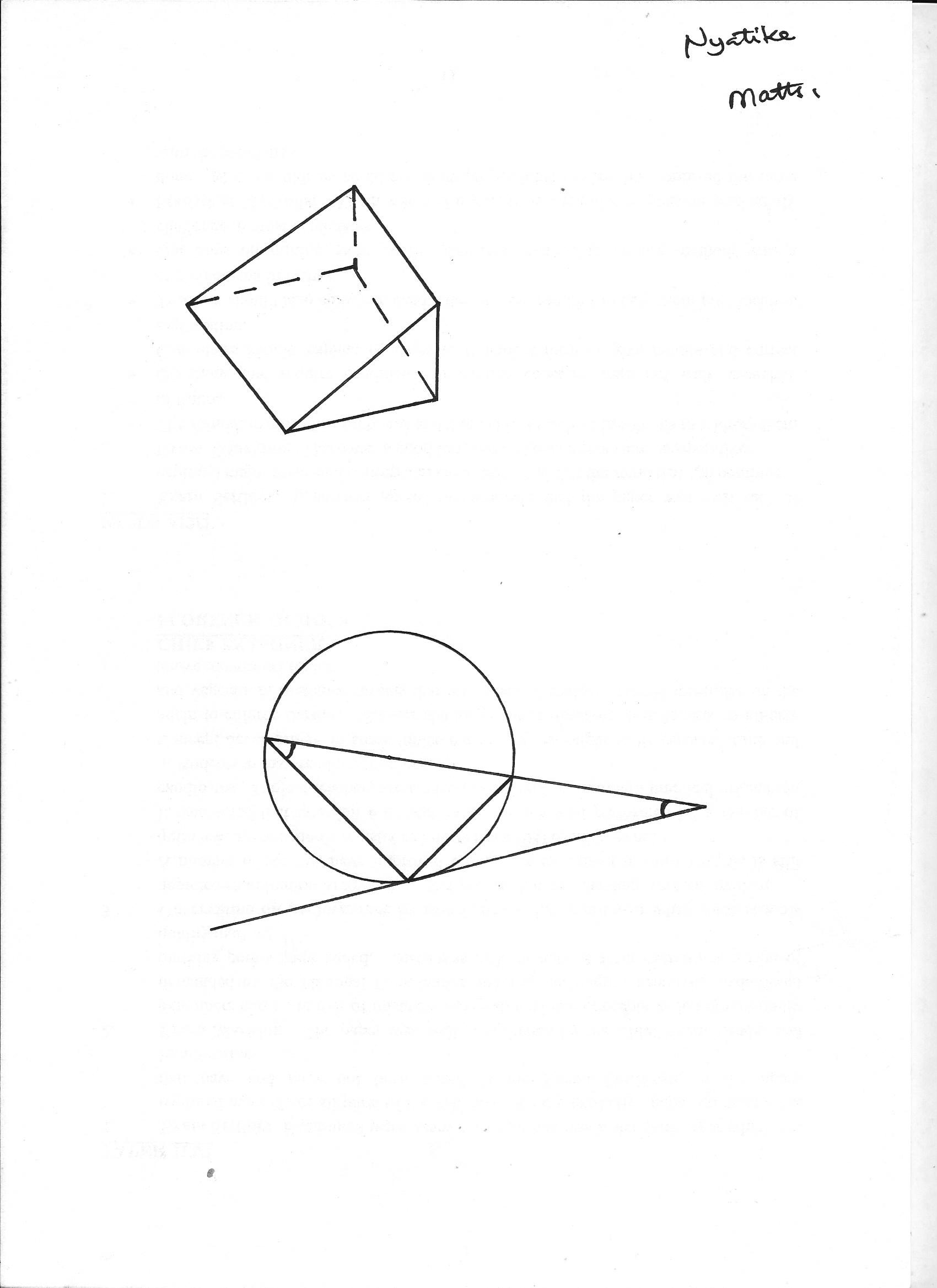
1. Use logarithms to evaluate :  ( 4mks)

2 A sales man gets a commission of 2.5 % on sales upto sh. 100.00 . He gets an additional commission of 1.6 % on sales above this. Calculate the commission he gets on sales worth sh. 320.00 ( 3mks)

1. Make P the subject of the formula ( 3mks)

w = 

1. Two dice are tossed and the outcome on each fie recorded. Find the probability that the sum shown on both die is greater or equal to 7. (2mks)
2. Brain and Bonface working together can do a piece of work in 6 days. Bonface working a lone would take 10 days to complete the work. They start working together but after 4 days Bonface leaves and the remaining work is done by Brian. Find how long Brian takes to complete the remaining work. ( 4mks)
3. Two variables M and N are such that M varies partly as N and Partly as the square root of N. given that N = 16 when M = 500 and N = 25 when M = 800. Find the equation connecting M and N ( 4mks)
4. Given log = 0.4771 and log 5 = 0.6990, find without using table or calculator log 0.045. (3mks)
5. A certain sum of money put to compound interact amounts to sh.5600 at the end of the first year. The interest added at the end of the second year is sh.672, calculate the rate percent p.a and the sum invested. (4mks)



**D**

**A**

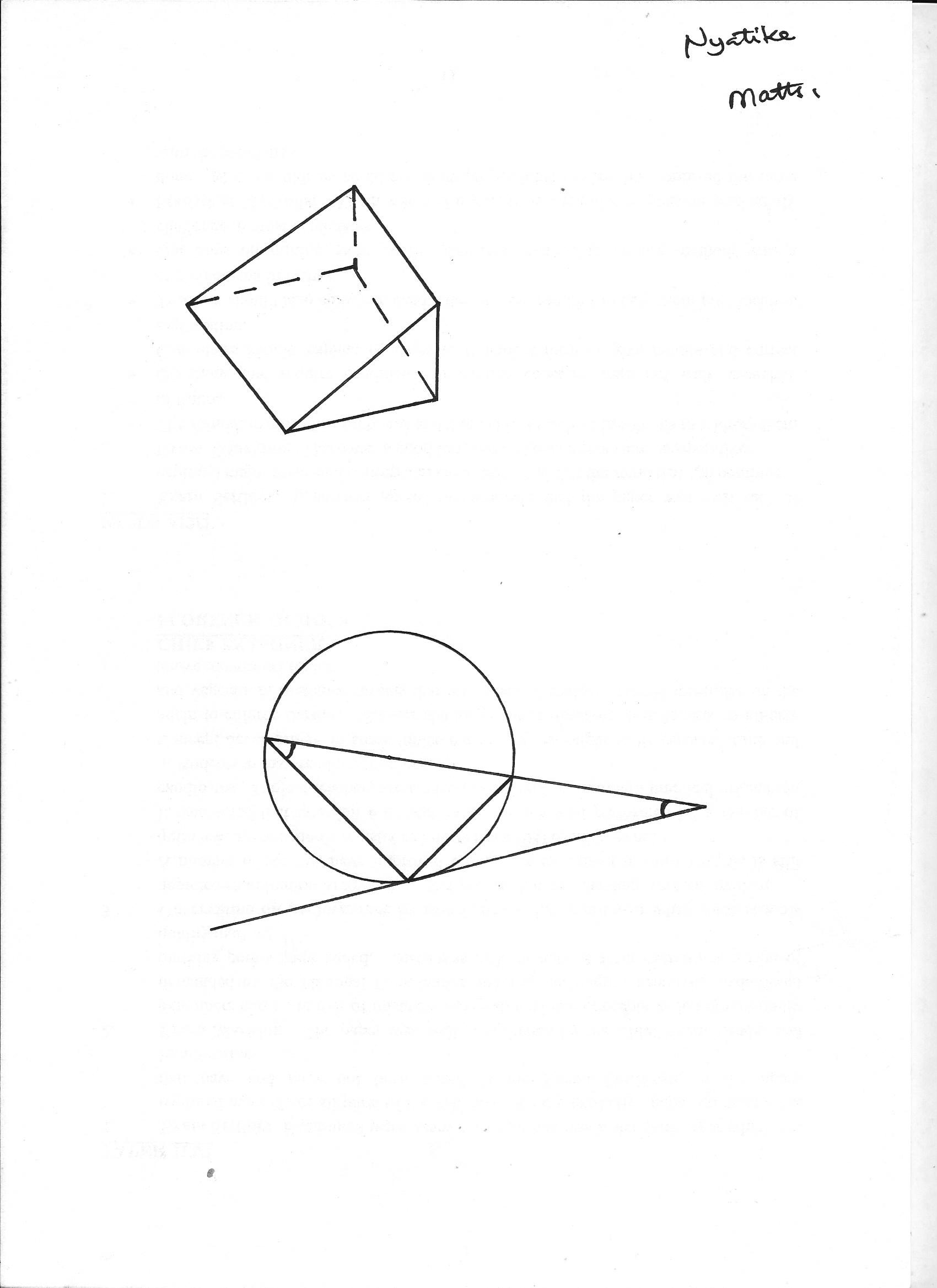
**C**

**F**

**E**

**B**

The diagram above represents a redge in which AB= BC= 12cm and CF = 5cm. determine the angle between the plane ABFE and the plane ABCD (2mks)

1. Find the constant term in the expansion  ( 3mks)
2. A tuktuk taxi travelling at 20m/s accelerates uniformly and in 4 seconds, its velocity is 30m/s. it maintains this velocity for another 5 seconds before decelerating uniformly to rest after 3 seconds. calculate the total distance travelled by the tuktuk during the journey. (3mks)
3.  In the figure below, AB X is a tangent . Angle CAB = 17o and angle ACB = 36o calculate the size of angle BDC (3mks)

**C**

**36o**

**D**

**A**

**B**

**X**

1. Find  given that y  ( 3mks)
2. The perimeter of a triangular field is 120m. two of the sides measures 21m and 40m. calculate the size of the largest angle of the field. (3mks)
3. Solve for x 2 2x + 3 - 9 (2x) + 1 = 0 ( 3mks)
4. Peters joined a firm with a commencing salary of 20,000 per month with an animal monthly increment of 10%. How much does he receive per moth during the seventh year. (3mks)
5. An examination involves a written and a practical test. The probability that a candidate passes the written test is 6/11. If a candidate passes a written test then the probability of passing the practical test is 3/5, other wise it would be 2/7.
6. Illustrate this information on a tree diagram ( 2mks)
7. Determine the probability that a candidate is awarded
8. (i) credit for passing both tests ( 2msk)

(ii) pass for passing the written test ( 2mks)

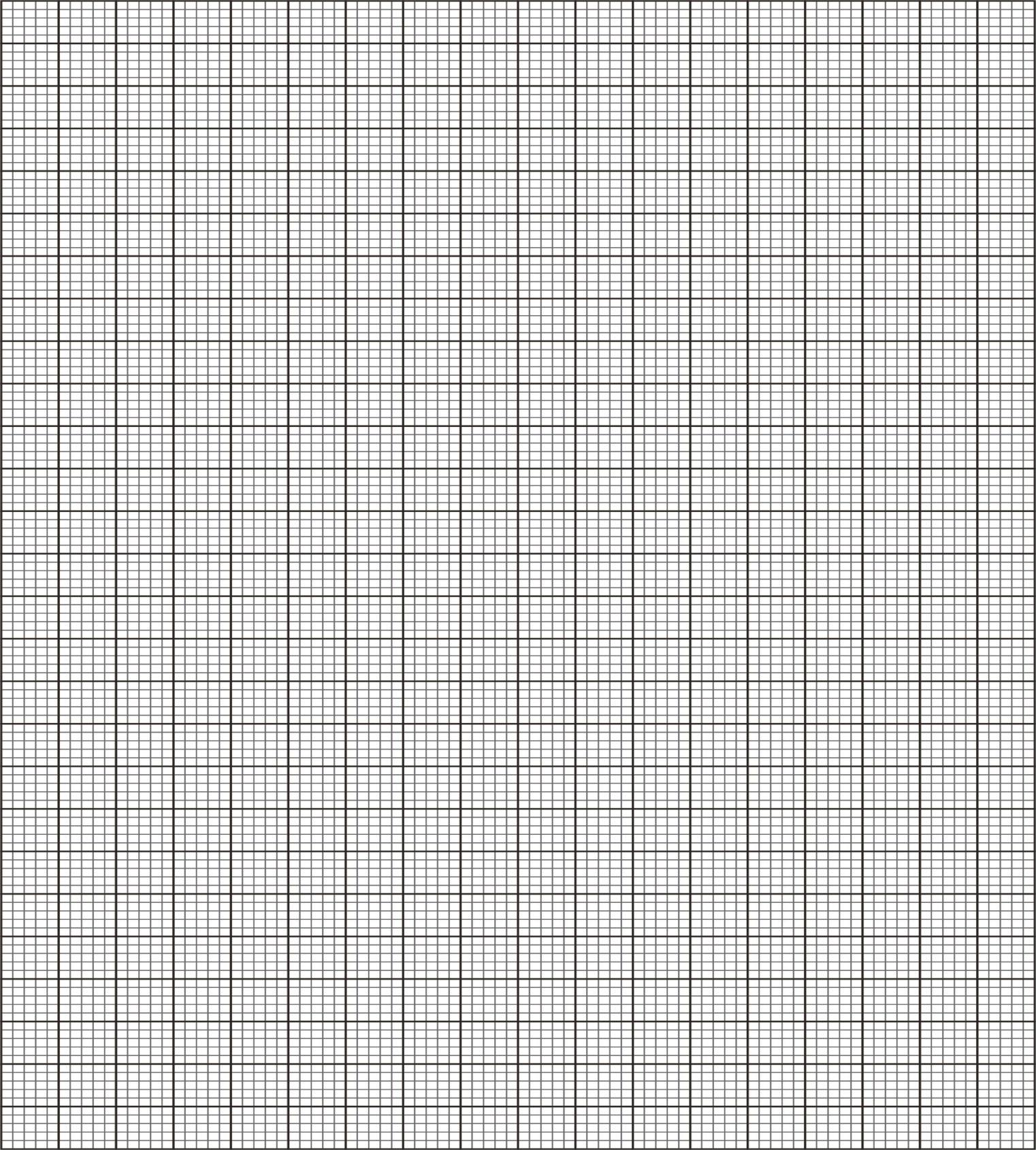
(iii) retake for passing the test ( 2mks)

(iv)Fail for not passing the test ( 2mks)

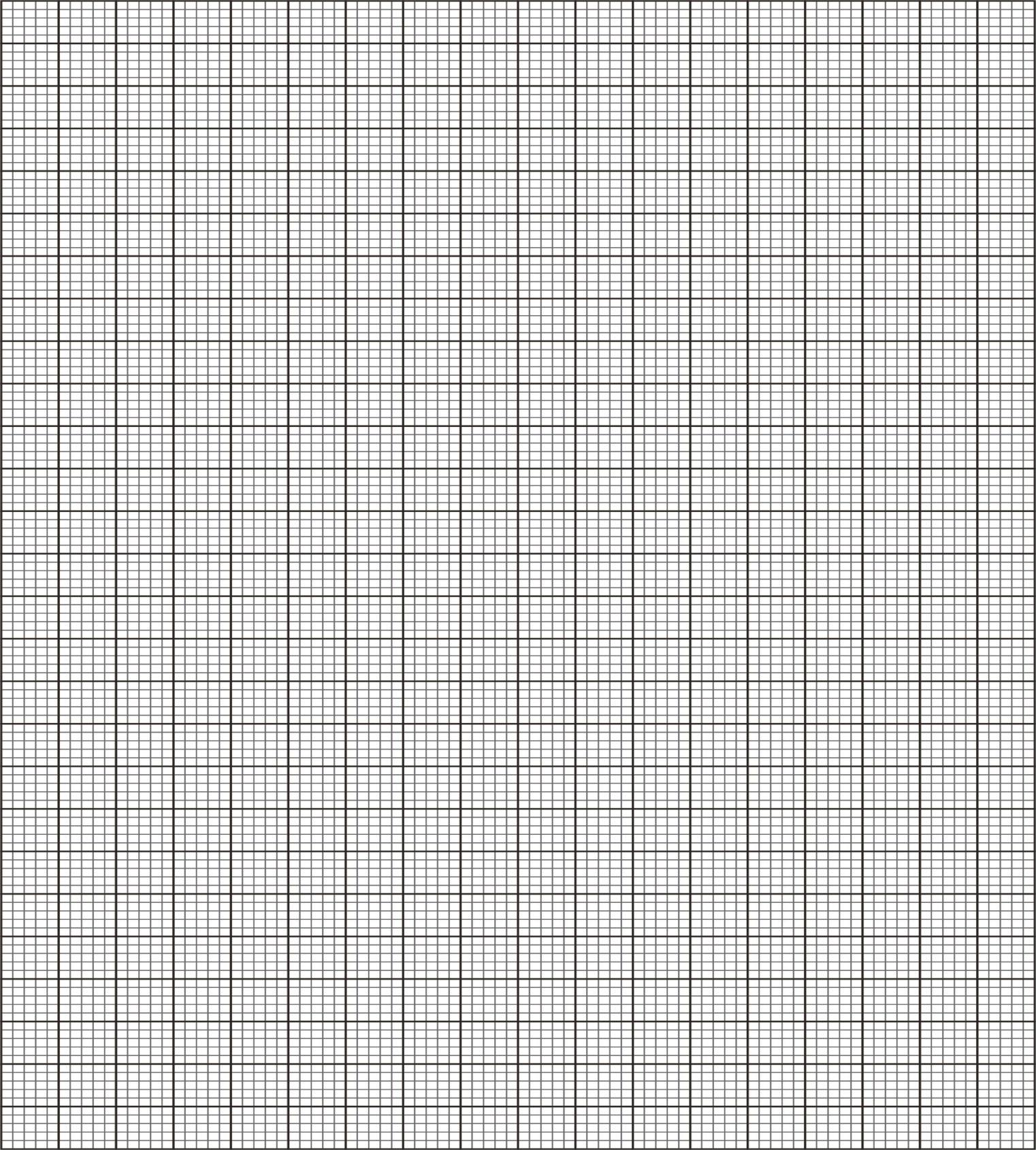
1. . The relationship between the variables a and y is believed to be y = a/x + bx. Where a and b are constants. The table below shows corresponding values of x and y

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| X | 1 | 2 | 3 | 4 | 5 |
| Y | 5.00 | 7.00 | 9.67 | 12.50 | 15.40 |

1. Write the relationship in the form of y = mx + c (1mk)
2. By drawing a suitable straight line graph estimate the values of a and b (7mks)



1. Find the value of y when x = 1000 (2mks)
2. The vertices of triangle ABC are a(3,1) B (0,2) and c ( 2,-1)
3. A'B'C' is the image of ABC under reflection on the line y x = 0. Draw A'B'C' on the grid provided hence state the co-ordinates of its vertices (3mks)
4. A''B''C'' is the image of A'B'C' under positive quarter turn about the origin. Draw triangle A''B''C'' and state the co-ordinates of its vertices. (3mks)
5. A'''B'''C''' is the image of triangle ABC under shear matrix, y axis invariant and linear scale factor 3. Write down the shear matrix hence find the co-ordiantes of the vertices of triangle A'''B'''C''' ( 1mk)



1. Two points P and Q are found on the earth’s surface the position of P is ( 52oS,66oW) and Q ( 52oS,144oE). Taking earth’s radius as 6370km,

(a) find the difference in longitude between the two points P and Q (1mk)

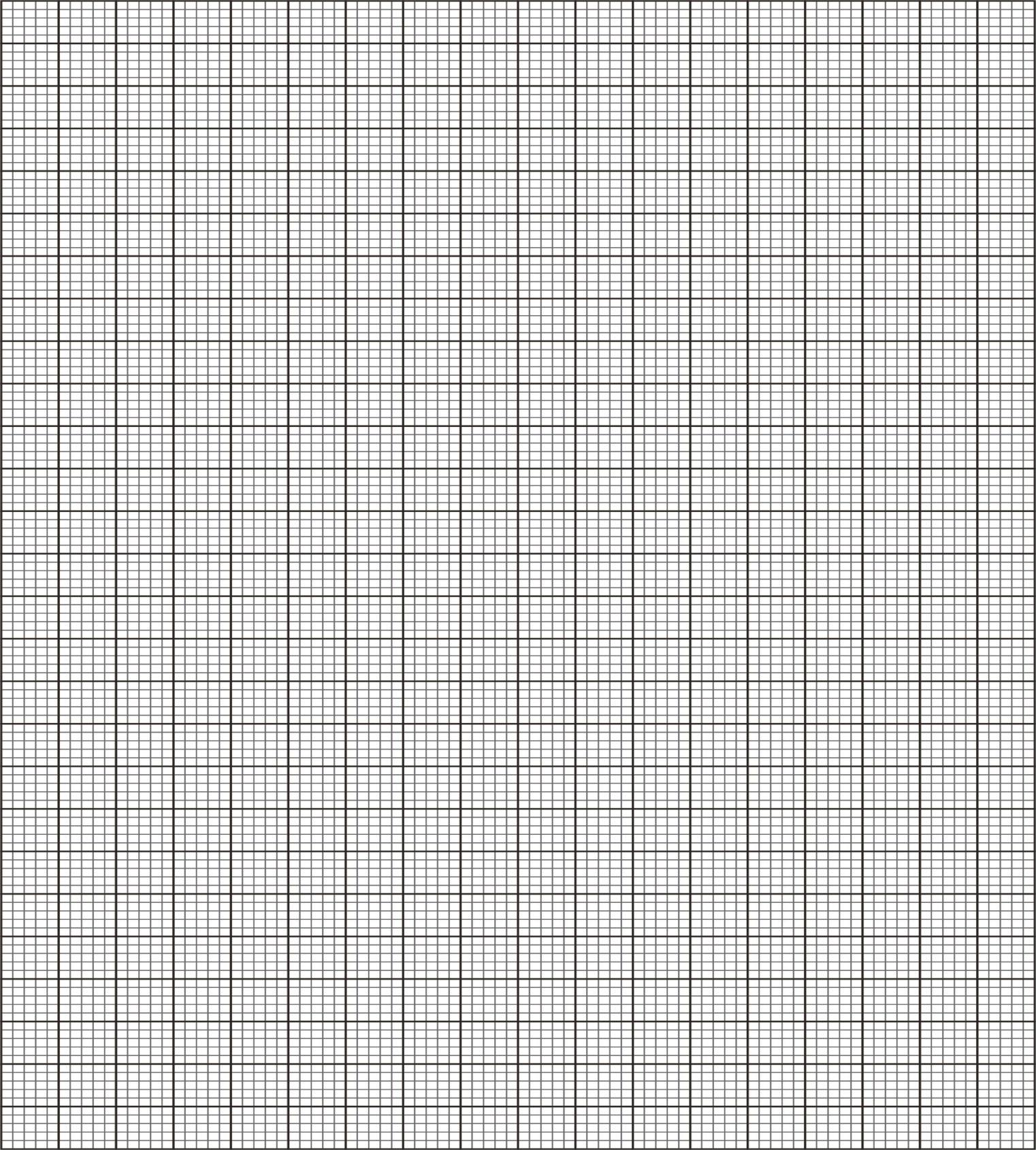
(b) (i) calculate the shortest distance between points P and q along (i) the latitutde in km (1mk)

(ii) The longitude in Km ( 4mks)

1. A plane travelling at 800km/hr leaves point P At 10.00am and sais through south pole to point q. Find the local time the plane arrives at point Q to the nearest minute. (4mks)
2. Tosincompany has two types of machines, A and B for juice production. Type A machine can produce 800 litres per day while type A machine can produce 1600 litres per day. Type A machine needs four operators and type B needs seven operators. At least 800 litres must be produces daily and the total number of operators should not exceed 41. There should be two or more machine of each type.

Leting x be the number of machines of type A and y for type B.

1. Form all inequalities in x and y to represent the above information (4mks)
2. On the grid provided below,draw the in equalities and shade the unwanted region (4mks)



1. Use the graph I (b) above to determine the least number of operators required for the maximum possible production. (2mk)
2. Using a ruler and a compass only,construct a triangle ABC such that AB = 6.8 cm, BC = 5.6 cm and angle ABC = 37 ½ o (3mks)

(b) Locate the :

(i) Locus P such that angle APB = angle ACB (3mks)

(ii) Locus Q such that Q is equidistant to points A and B (2mks)

(iii) Locus R such that R is equidistant to lines AB and AC (2mks)

1. The distance S meters from a fixed point O, covered by a particle after t seconds B given by the equation S = t3 – 6t2 + 9t + s

(a) calculate the gradient of the curve at t = 0.5 seconds (3mks)

(b) Determine the values of S at the turning points of the curve ( 3mks)

(c) Sketch the curve in the space provided. (4mks )

24. The table below shows the distribution of marks obtained by 50 students

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Marks | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 | 75-79 |
| No of students | 3 | 9 | 13 | 15 | 5 | 4 | 1 |

1. Calculate the mean using asuitable assumed mean ( 3mks)
2. calculate the variance ( 3mks)
3. calculate standard deviation ( 1mk)
4. If 30 students were to pass ,calculator the pass mark ( give your answer to nearest whole mark) (3mks)