FORM 2 - MATHEMATICS - Paper 1/2
ASSIGNMENT 1-6

ASSIGNMENT 1

1. Evaluate without using tables or calculators. (3mks)

$$\frac{0.036 \times 0.0049}{0.07 \times 0.048}$$

2. The sum of interior angles of a regular polygon. Find the size of each exterior angle. (3mks)

3. The length of an arc of a circle is $\frac{1}{5}$ of its circumference. If the area of the circle is 346.5cm^2, find the angle subtended by the arc at the Centre of the circle. (4mks)

4. Given that x=2y and 3y=5z find the ratio x:y:z hence or otherwise find the amount of money Ali got if Ali, Ben and Chris shared Kshs. 36000 in the ratio x:y:z respectively. (4mks)

5. A plane leaves town A for town B at 0540 hours. If the journey takes 6.5 hours, at what time does the plane reach its destination? (3mks)

6. A cylindrical solid metal is 3m long and has a mass of 4kg. if its density is 5.6g/cm^3, find the radius of its end. (take π=3.142) (4mks)

7. Express the number 9000 as a product of its prime factors. (1mk)

   b) Find the value of P if the number 9000P is a perfect cube. (2mks)

8. Find the value of T given that T=$\dfrac{ab}{a^3+bc}$ and a=2, b=-1,and c=-3 (3mks)

9. A shop keeper sells a shirt for Kshs. 350 thereby making a profit of 40%. Calculate the buying price of the shirt. (3mks)

10. The GCD of three numbers is 45 and their LCM is 18900. Two of the numbers are 675 and 540. Find the other possible numbers. (2mks)

10. Find the perimeter of the figure below. (Take $\pi=22/7$). (3mks)

3.5cm

75^0
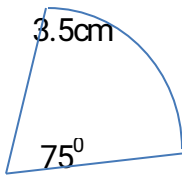
John is twice as old as his friend Peter. Peter is 5 years older than Alice. In 5 years John will be three times as old as Alice. How old is Peter now? (3mks)

11. Ondieki had travelled from Texas to Kenya and arrived with U$17500 on 12/2/2013. On arrival he changed the dollars into Kenya shillings and immediately used Kshs. 850,000. Later on 15/2/2013 he had some immediate use of £3600 and therefore c hanged all the money he had into sterling pounds. Finally on 18/2/2013 he converted what remained to Kenya shillings.

	Buying	Selling
	Kshs.	Kshs.
12/2/2013 U$	82.36	85.74
15/2/2013 £	110.14	118.26
18/2/2013 £	112.64	119.56

How much did he remain with in Kenya shillings? (3mks)

12. The sum of the digits of a two digits number is 13. If the digits are reversed the number decrease by 27. Find the number. (3mks)

13. A man walks to work at 16km/hr and back home at 5km/hr. find the distance from his work place if the whole journey takes him 2 hours 12 minutes. (3mks)

14. If $3 = \dfrac{1}{4x} = \dfrac{1}{8x}$, find the ratio $\dfrac{1}{2x} + 2 : \dfrac{1}{3x} + 1$ (3mks)

15. (a) Using a ruler and a pair of compasses only construct a triangle ABC such that AB=4cm, BC=5cm and ∠ ABC=120^0. Measure AC. (4mks)

b) On the diagram, construct a circle which passes through the vertices of the triangle ABC. Measure the shortest distance from the centre of the circle to line BC. (4mks)

c) Measure the radius of the circle. (2mks)

16. Two aero planes P and Q leave an airport at the same time. P flies on a bearing of 240^0 at 900km/h while Q flies due East at 750km/h.

a) Using a scale drawing of 1cm to represent 100km, make a scale drawing to show the positions of the planes after 40 minutes. (5mks)

b) Determine the bearing of

i) P from Q (2mks)

ii)   Q from P   (2mks)

c)   Find the shortest distance between plane P and plane Q after 40 minutes.   (1mk)

17. A construction company requires to transport 144 tonnes of stones to sites A and B. the company pays Kshs. 24000 to transport 48 tonnes of stone for every 28 km. kimani transported 96 tonnes to a site A, 49km away.

a)   Find how much he paid.   (3mks)

b)   Kimani spends Kshs. 3000 to transport every 8 stones to the site. Calculate his total profit. (4mks)

c)   Achieng transported the remaining stones to sites B, 84km away. If she made 44% profit, find her transport cost.   (3mks)

18. A tank has two inlet taps P and Q and an outlet tap R. when empty, the tank can be filled by tap P in $4^1/2$ hours and by tap Q in 3 hours. When full the tap can be emptied in 2 hours by tap R.

a) The tank is initially empty, find how long it would take to fill up the tank;

i) If tap R is closed and taps P and Q are opened at the same time. (3mks)

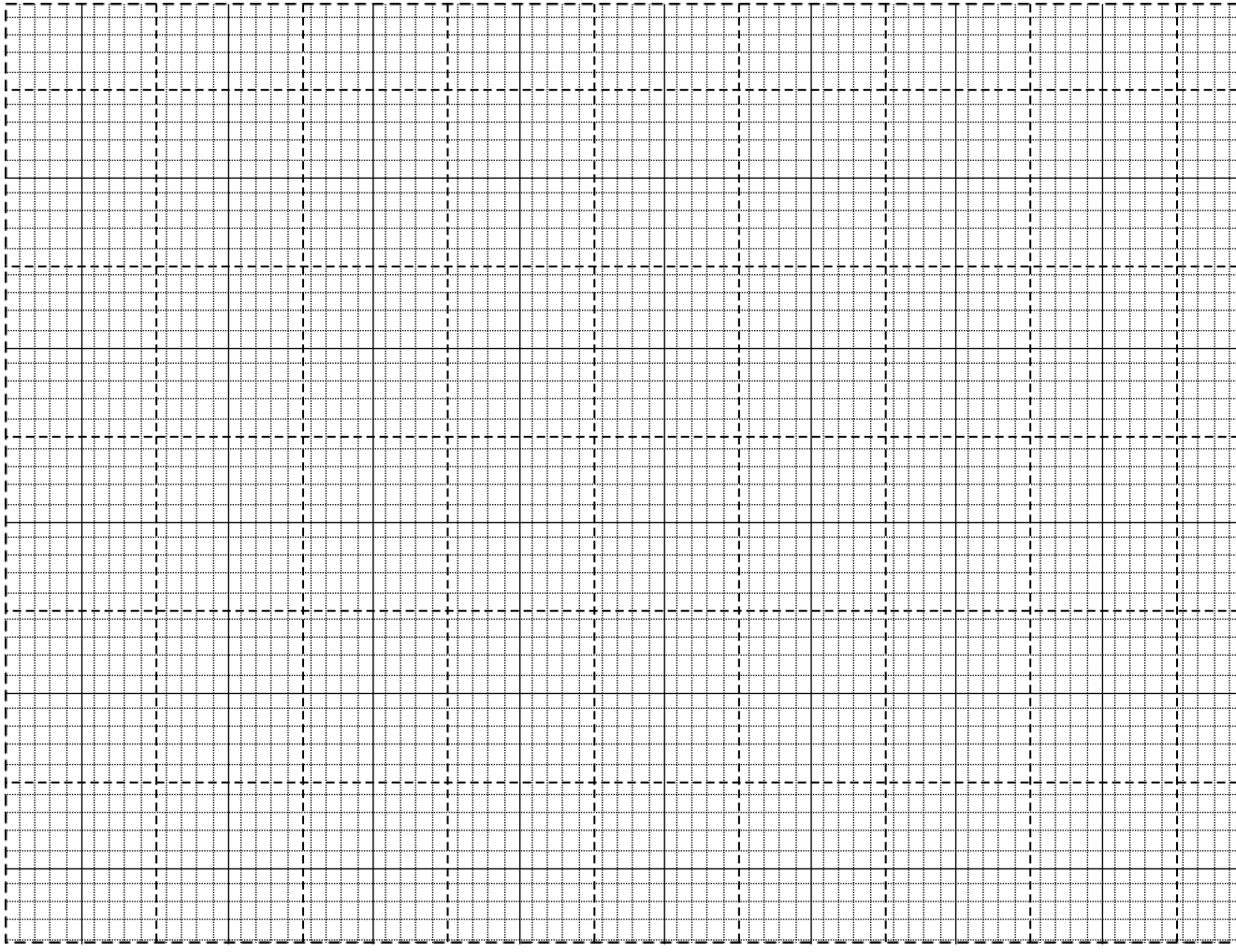ii) If all the three taps are opened at the same time. (3mks)

b) Find the fraction of the tank that would be filled by 9.00am if initially the tank is empty and the taps are opened as follows. (4mks)

P at   8.00 am   R at   9.00 am

Q at   8.45 am

19. a) Plot the graphs of the equations $y=2x + 3$ and $y=-\frac{1}{2}x +3$. (4mks)

b) Use your graph to find the coordinates of the point of intersection of the two lines. (2mks)

c) Hence, state the solutions to the equations $y=2x + 3$ and $y=-\frac{1}{2}x +3$. (2mks)

d) Find the angle made by the line y=2x+3 and the x-axis. (2mks

20. A coffee farm was surveyed and its measurements entered in a field book as shown below. (Take XY=400m as the baseline.)

```
                        Y
      360    80 to Q
      to R 80      280
      to S 160     200
      40    200 to P
                        X
```
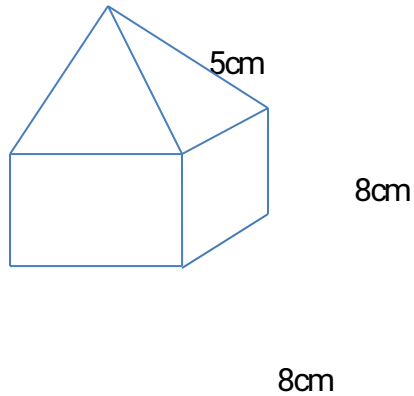
a) Using a scale of 1cm to represent 40m, draw the map of the coffee farm. (3mks)

b) Find the area of the coffee farm in hectares. (7mks)

21. A model of a tent consists of cube and a pyramid on a square base as shown below.

5cm

8cm

8cm

a) Draw accurately the net of the model.   (2mks)

b) Use the net to calculate the total surface area of the model. (4mks)

c) If the ratio of the area of the model to the area of the actual is 1:10000, find the area of the material required to make the tent (floor area inclusive) in m^2.   (4mks)

22. a) Water and alcohol are mixed in the ratio 1:4. Find the density of the mixture if the density of water is 1g/cm^3 and that of alcohol is 0.8g/cm^3.   (4mks)

b) 40 cm^3 of water is poured into an empty measuring cylinder. A stone of mass 129g is put into the cylinder. If the density of the mixture of the stone is 8.6g/cm^3, find the new reading of the cylinder. (4mks)

c) Convert 8.6g/cm^3 into kg/m^3. (2mks)

ASSIGNMENT 2

1. Simplify $\dfrac{\frac{5}{6} \ of \ \left(4\frac{1}{3} - 3\frac{5}{6}\right)}{\frac{5}{12} \times \frac{3}{25} \div 2\frac{1}{3}}$ without using a calculator. (3marks)

2. Solve the simultaneous equation.

$$\frac{x-1}{y+1} = \frac{1}{4} \qquad and \qquad \frac{x+1}{y-1} = \frac{2}{3}$$ (3marks)

3. Evaluate: $\dfrac{44 - (-28)}{12 \times -2} - \dfrac{8^2 \times -12 - 24}{96 \div -12 \times 9}$. (3marks)

4. Reduce the following expression onto a single fraction.

$$\frac{4x-5}{2} - \frac{2x-1}{6}$$

(3 marks)

5. Simplify: $\dfrac{512^{\frac{4}{3}} \times 27^{\frac{-2}{3}}}{128^{2} \times 9^{-2}}$

(3 marks)

6. The marked price of a car in a dealer's shop was Ksh 450,000/=. Nasieku bought the car at 7% discount.

The dealer still made a profit of 13%. Calculate the amount of money the dealer had paid for the car to the

nearest thousands. (4marks)

7. The size of an interior angle of a regular polygon is $3x^{0}$ while exterior is $(x-20)^{0}$. Find the number of sides of the polygon. (4marks)

8. All prime numbers less than ten are arranged in ascending order to form a number.

a) Write down the number formed. (1 mark)

b) Express the number in (a) above in expanded form. (1 mark)

9. Use the tables of reciprocals and square roots to evaluate.

$$\frac{0.1}{0.0351} + \sqrt{0.498}$$ (4 marks)

10. The G.C.D. and L.C.M. of three numbers are 3 and 1008 respectively. If two of the numbers are 48 and 72, find the least possible value of the third number. (3 marks)

11. The ratio of Mueni's earning to Kilonzo's earning is 5:3. If Mueni's earning is increased by 17% her new

figure becomes Kshs. 18,000. Find the corresponding percentage change in Kilonzi's earnings if the sum of

their new earnings is Kshs. 24,600. (3 marks)

12. A straight line through the points A (2, 1) and B (4, m) is perpendicular to the line whose equation is

3y = 5-2x. Determine the value of m. (3marks)

13. Use logarithms to evaluate, correct to 4 decimal places. $\sqrt{\dfrac{3.45 + 2.62}{786 \times 0.0007}}$

(4marks)

14. The figure below shows a net of a solid which is not drawn to scale.
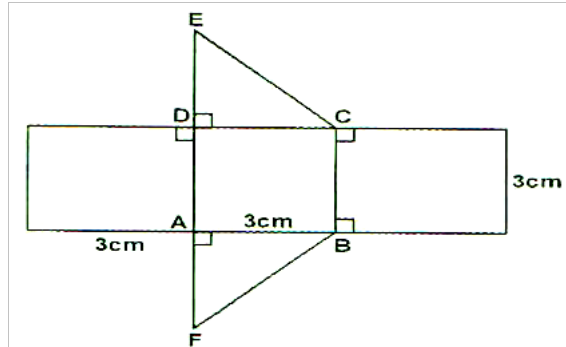
Sketch the solid ABCDEF with ABCD as the base. (2 marks)

15. The diagonal of a rectangular garden measures $11\frac{1}{4}$ while its width measures $6\frac{3}{4}$. Calculate the perimeter of the garden. (3 marks)

16. A number **n** is such that when divided by 3, 7, 11 or 13, the remainder is always one.

Find the number **n**.   (3marks)

Section II (50 marks)
Answer any five questions in this section.

17.   A salesman is paid a commission of 2% on goods worth over Ksh.100000. He is also paid a monthly

salary of Ksh.12000. In a certain month, he sold 360 pairs of shoes at Ksh.500 each pair.

   (a) Calculate the salesman's earning that month.   (3 marks)

b) The following month, his monthly salary was increased by 10%. His total earnings that month were Ksh.17600. Calculate

(i) The total amount of money received from the sales of the shoes that month. **(5 marks)**

(ii) The number of pairs of shoes sold that month. **(2 marks)**

18. A line T, which passes through the points (-3, -5) and (3, -6) and is perpendicular to a line the L at the point (-2, -2).

a) Find the equation of L. **(3 marks)**

b) Find the equation of line T in the form ax + by = c where a, b and c are constants. **(2 marks)**

c) Given that another line Q is parallel to T and passes through (1, -3) find x and y intercepts of Q.

(2 marks)

d) Find the points of intersection of L and Q. **(3 marks)**

19. Three warships A, B and C are at sea such that ship B is 500km on a bearing N30E from ship A. Ship C is 700km from ship B on a bearing of 120°. An enemy ship D is sighted 800km due south of ship B.

a) Taking a scale of 1cm to represent 100km, locate the positions of ships A, B, C and D. **(4 marks)**

b)   Find the bearing of:

i)   Ship A from D.   (1 mark)

ii)   Ship D from C.   (1 mark)

c)   Use scale drawing to determine the distance between

i)   D and A.   (1 mark)

ii)   C and D.   (1 mark)

d)   Measure angle DAC and angle BCD   (2 marks)

21.   A surveyor recorded the measurements of a field in a field book using lines AB 260m as   shown below.

	B	
	170	
E50	140	
	110	C60
F80	100	
	30	B50
	A	

a)   Draw the map of the field.   (4marks)

b)   Find the area of the field in hectares.   (6marks)

22. (a) The average lap time for 3 athletes in a long distance race is 36 seconds, 40 seconds and 48 seconds respectively. If they all start the race at the same time, find the number of times the slowest runner will have been overlapped by the fastest runner at the time they all cross the starting point together again.

(7marks)

(b) Three fifth of work is done on the first day, on the second day $\frac{2}{3}$ of the remainder is completed. On the third day, $\frac{7}{8}$ of what remained is done. What fraction of work still remains to be done? **(3marks)**

23.a) Atyang bought 3 blouses and 2 skirts for a total of Ksh.500. Awino bought 4 blouses and 5 skirts for a total of Ksh.900. Find the cost of 1 blouse and 3 skirts. **(6marks)**

c)A two digit number is such that the difference between the ones digit and the tens digit is 2. If the two digits are interchanged, the sum of the new and the original number is   132. Find the original number.

(4 marks)

ASSIGNMENT 3
SECTION I (50 MARKS)
Answer ALL Questions in this Section.

1.   Use tables of square, cubes roots and reciprocals to find the value of x if $x = \sqrt[3]{\dfrac{1}{0.2365} + \dfrac{2}{(2.6228)^2}}$

(3 marks)

2.   Find the value of x if $\left(\dfrac{27}{8}\right)^{x+7} = \left(\dfrac{4}{9}\right)^{-3x}$ (3 marks)

3.   Factorise completely $2x^3 - 32xy^4$.   (3 marks)

4. A two digit number is such that the difference between the ones digit and the tens digit is 2. If the two digits are interchanged, the sum of the new and the original number is 132. Find the original number. **(3 marks)**

5. A Kenyan bank buys and sells foreign currencies using the rates shown below.

	Buying (Ksh)	Selling (Ksh)
1 Euro	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 Kenya shillings at the bank. While in Kenya he spent a total of Ksh.289,850 and then converted the remaining Kenya shillings to Japanese Yen at the bank. Calculate the amount of Japanese Yen that he received. **(3marks)**

6. In the figure below$\angle$MNO = 54^0 and $\angle$PLM = 50^0, PN = NM and PO is parallel to LM. Find the value of

L〰〰〰〰〰〰〰〰→ M
50°

$\angle$LPM.   (3 marks)
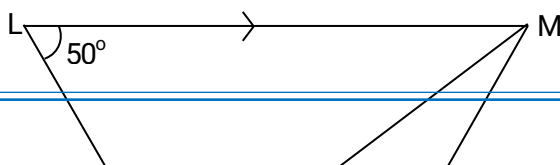
7.   Two similar solids have surface areas of 48cm^2 and 108cm^2 respectively. Find the volume of the smaller solid if the bigger one has a volume of 162cm^3.   (3marks)

8.   In Station Church Choir, the ratio of male to female is 2:3.   On a one Sunday service, 10 male members were absent and six new female members joined the choir as guests for that day.   If on this day the ratio of males to females was 1:3, how many regular members does the choir have?
(3 marks)

9.   The average lap time for 3 athletes in a long distance race is 36 seconds, 40 seconds and 48 seconds respectively. If they all start the race at the same time, find the number of times the slowest runner will have been overlapped by the fastest runner at the time they all cross the starting point together again.

(3marks)

10.   Given that point A (2, 4) and B (8, -4), find the equation of the perpendicular bisector of line AB.

(4 marks)

11.   Without using a calculate, evaluate

$$\frac{\left(3\frac{1}{3} + 1\frac{1}{9}\right) \div 1\frac{1}{3}}{\left(4\frac{2}{9} - 2\frac{5}{9}\right) \times \frac{2}{3}}$$

(3 marks)

12.   The line segment AB is rotated onto the line AB, Find by construction, the centre and angle of rotation.
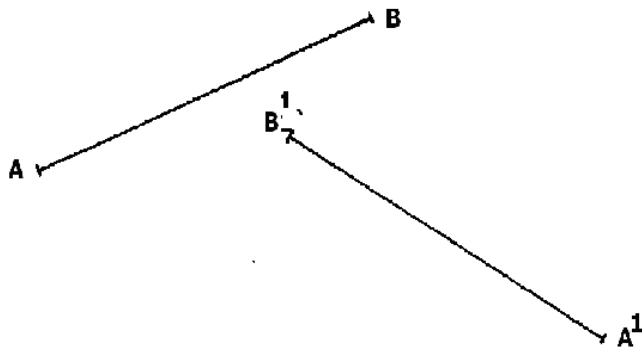
(3marks)

13. Under an enlargement centre (2, 1) the image of P (1,-1) is P' (4, 5). Determine the scale factor of the enlargement **(2marks)**

14. A cylindrical iron pipe is 2.lm long and 12cm in external diameter, the metal is 1cm thick and its density is 7.8g/cm^3. Taking pie as 3 ½, find its mass. **(4 marks)**

15. A man standing 20m away from the foot of a vertical pole observes the top of the pole at an angle of elevation 30°. He begins to walk along a straight line on level ground towards the pole. Calculate how far he walked before the angle of elevation of the top of the pole becomes 80°.

(4 marks)

16.   A regular polygon has internal angle of 150^0 and a side of length 10cm.

(a)   Find the number of sides of the polygon   (2marks)

(b)   Find the perimeter of the polygon   (2marks)

Section II (50 marks)
Answer any five questions in this section.

17.a)   A triangle ABC is such that AC = 6cm, $\angle$BAC = 40° and the area of the triangle is 12cm². Find the length of AB giving your answer to 4 significant figures.   (3 marks)

b) A shamba is in the shape of a parallelogram with the lengths of the adjacent sides being 12cm and 15cm. If the area of the parallelogram is 72cm^2, find the angle between these two sides.
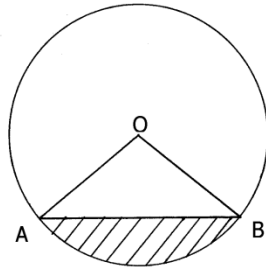
(4marks)

c) Given that $\cos(x-20)^0 = \sin(2x+32)^0$ and x is an acute angle, Find $\tan(x-4)^0$.

(3 marks)

18. In the figure below, O is the centre of the circle of radius 3cm and AB is a chord such that its shortest distance

from O is 1cm.

Calculate:

a) The length of the chord AB.   (3marks)

b) Angle AOB   (2marks)

c) The area of the minor sector OAB.   (2marks)

d) The area of the shaded segment.   (3marks)

19.   Three partners Mutu, Mutho and Mwika contributed Sh. 600,000, Sh. 400,000 and Sh. 800,000 respectively
       to start a business of a matatu. The matatu carries 14 passengers with each paying Sh. 250. The matatu makes

two round trips each day and is ever full. Each day Sh. 6000 is used to cover running costs and wages.

a) Calculate their net profit per day. (2 marks)

b) The matatu works for 25 days per month and is serviced every month at a cost of KSh.10, 000. Calculate their monthly profit in June. (1 mark)

c) The three partners agreed to save 40% of the profit, 24% to be shared in the ratio of their contribution. Calculate Mutho's share in the month of July. (4 marks)

d) The matatu developed mechanical problems and they decided to sell it through an agent who charged a commission of 5% on selling price. Each partner received Kshs. 475,000 from the agent after he had taken his commission. Determine the price at which the agent sold the matatu.
(3 marks)

20. The figure below shows a model of a solid in the shape of a frustum of a cone with a hemispherical top.
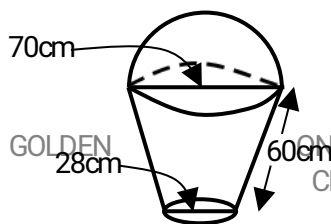
70cm

28cm

60cm

The diameter of the hemispherical top is 70cm and is equal to the diameter of the top of the frustum. The frustum has a base diameter of 28cm and a slant height of 60cm.

a) Calculate the area of the hemispherical surface. (1mark)

b) Calculate the slant height of the cone from which the frustum was cut. (4marks)

c) Calculate the total surface area of the model (5 marks)

21. On some day, Mr. Machungwa bought some oranges worth Kshs45, on another day of the same week his wife; Mrs. Machungwa spent the same amount of money, but bought the oranges at a discount of 75 cents per orange.

(a) If Mr. Machungwa bought an orange at Kshs x , write down and simplify an expression for the total number of oranges bought by the two in the week. (3 marks)

(b)   If Mrs. Machungwa bought 2 oranges more than her husband, find how much each spent on an orange.

(5 marks)

(c)   Find the number of oranges bought by the two.   (2 marks)

22.   A rectangle PQRS has coordinates P (4, 2) and Q (2, 8). Given that the equation of line PR is

y = χ - 2, find

(a)   The equation of line QR.   (3 marks)

(b)   The coordinate of point R.   (3 marks)

(c)   The coordinate of point S.   (4 marks)

23.   Four points B, C, Q and D lie on the same plane. Point B is 42 km due south – west of point Q. Point C is 50km on a bearing of S60ºE from Q. Point D is equidistant from B, Q and C.

a)   Using the scale of 1cm represents 10 km; construct a diagram showing the positions of B, C, Q and D.

b)   Determine the:

i)   Distance between B and C .   (1mark)

ii)   Bearing of D from Q.   (1mark)

iii) Bearing of D from B.   (2marks)

24.   A surveyor recorded the measurements of a field in a field book using lines AB 260m as   shown below.

	B	
	170	
E50	140	
	110	C60
F80	100	
	30	B50
	A	

a)   Draw the map of the field.   (4marks)

b)   Find the area of the field in hectares.   (6marks)

ASSIGNMENT 4

Answer all the questions in this section in the spaces provided

1. Without using a calculator evaluate   (3marks)

$$\frac{\frac{1}{2} \text{ of } 3\frac{1}{2} + \frac{3}{2}\left(\frac{5}{2} - \frac{2}{3}\right)}{\frac{3}{4} \text{ of } 2\frac{1}{2} \div \frac{1}{4}}$$

2. Simplify the expression: $\dfrac{3x^2 - 4xy^2 + y}{9x^2 - y^2}$ (3marks)

3. Four strings measuring 12cm, 18cm, 24cm and 36cm are cut into pieces of equal length so that exact number of pieces is obtained from each string without wastage. Find the longest length of each string.   (2marks)

4. All prime numbers between ten and twenty are arranged in descending order to form a number.
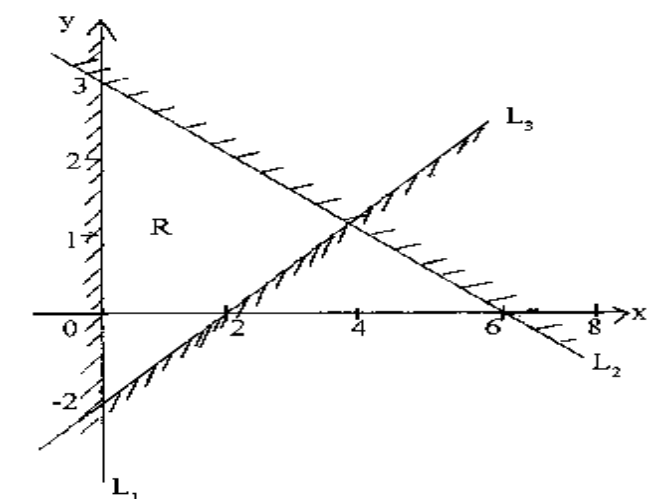
     (i)   Write down the number.   (1mark)

     (ii)   State the total value of the third digit of the number formed in (i) above.   (1mark)

5. Use tables to evaluate:-

(3 marks)

$$\frac{5}{(0.293)^2} - \sqrt{(4.125)^3}$$

.

6. The Region R in the figure below is defined by the inequalities L_1, L_2 and L_3.

Find the three inequalities. (3marks)

7. Without using tables calculate the value of:

$$\frac{1 + Cos\ A}{1 - Sin\ A}$$

Where A is an acute angle and tan A = $\frac{3}{4}$.   (3marks)

8. .Solve for χ in the equation:

$$\frac{3^x}{9} = \frac{1}{3^{(1 - 2x)}}$$ (3marks)

9. Convert the recurring decimal.

$0.0\overset{\bullet}{0}\overset{\bullet}{9}$ into fraction.   (2marks)

10. .Use logarithm tables to evaluate: (4marks)
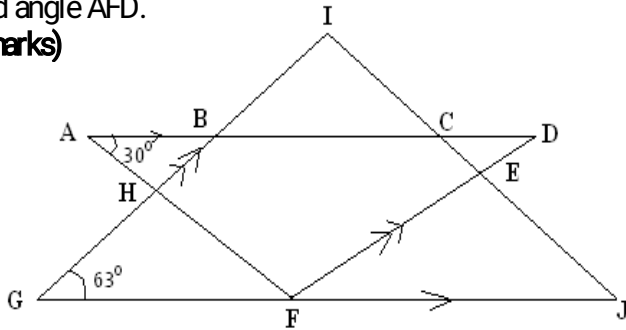
$$\frac{47.81 \; Log \; 5.623}{\sqrt{823 \times 72.46}}$$

11. The volume of a sphere is given by $\frac{4}{3}\pi r^3$. Find the radius of a sphere whose volume is 1047.816cm^3 (take π to be $\frac{22}{7}$)   (4marks)
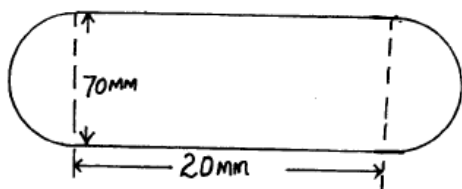
12. In the figure below, AD is parallel to GJ and GI is parallel to FD. Angle BAH = 30^0 and angle BGF = 63^0. Find angle AFD. (3marks)

13. The figure below (not drawn to scale) shows the cross-section of a metal bar of length 3 metres. They are equal semi circles.

Determine the mass of the metal bar in kilograms if the density of the metal is 8.87g/cm^3. (3marks)

14. Find the area of the sector of a circle of radius 3cm if the angle subtended at the centre is 140^0

   (3marks)

15. Using ruler and a pair of compasses only:

a. Construct triangle ABC in which BC = 8cm and angle ABC = 105^0 and angle BAC = 45^0.
   (3marks)

b. Drop a perpendicular from A to meet line BC at P. Determine the area of triangle ABC   (1mark)

16. A Forex Bureau in Kenya buys and sells foreign currencies as shown below:

                              Buying   Selling

Currency	(Kshs)	(Kshs)
Chinese Yuan	12.34	12.38
South African Rand	11.28	11.37

A businesswoman from China converted 195 250 Chinese Yuan into Kenya Shillings.

(a)   Calculate the amount of money, in Kenya shillings, that she received.   **(1 mark)**

(b)   While in Kenya, the businesswoman spent Kshs.1 258 000 and then   converted the balance into South African Rand. Calculate the amount of money, to the nearest Rand, that she received.

(3 marks)

SECTION II (50 MARKS)

Answer any FIVE questions in this section.

17. Five members of 'SILK', a self supporting enterprise Jane, Jepchoge, Esther, Mama Charo and Chepkoech were given a certain amount of money to share amongst themselves. Jane got 3/8 of the total amount while Jepchoge got 2/5 of the remainder. The remaining amount was shared equally among Esther, Mama Charo and Chepkoech each of which received Kshs. 6,000;

a. How much was shared among the five business women?   (3marks)

b. How much did Jepchoge get?   (2marks)

c. Jane, Jepchoge and Chepkoech invested their money and earned a profit of Kshs. 12,000. A third of the profit was left to maintain the business and the rest was shared according to their investments. Find how much each got.

(5marks)

18. The height of 200 students in a school were measured and recorded in the table below.All heights are given to the nearest cm.

Height (cm)	Class midpoint (x)	Frequency (f)	fx
135- 139		8	
140- 144		12	
145- 149		35	
150- 154		40	
155- 159		50	
160- 164		25	
165- 169		15	
170- 174		9	
175- 179		6	

a) Copy and complete the table.   (2mks)

b) State the modal class.   (1mk)

c) Use the completed the table to calculate the mean height of the students. (3mks)

d) Draw an histogram and hence a frequency polygon representing the above data.   (4mks)

19. A ship B is on bearing of 080^0 from port A and at a distance of 95km.   Another ship is stationed at port D which is on a bearing of 200^0 from A and a distance of 124km from B. A ship leaves B and moves directly to island P which is on a bearing of 140^0 from A.

a. Using a scale of 1cm to represent 10km, make a scale drawing to show the relative positions of A, B, D and P. (4marks)
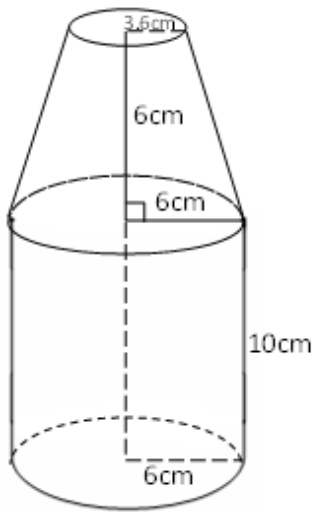
(b) Hence find:-

i.   The distance from A to D.   (2marks)

ii.   The bearing of D from B.   (1mark)

iii. The bearing of P from D.   (1mark)

iv.   The distance from P to D.   (2marks)

20. A right conical frustum of base radius 6cm is mounted on top of a cylinder of the same base radius and height 10cm. The top of the solid frustum is of radius 3.6cm. The height of frustum is also 6cm. Take $\pi = \frac{22}{7}$.

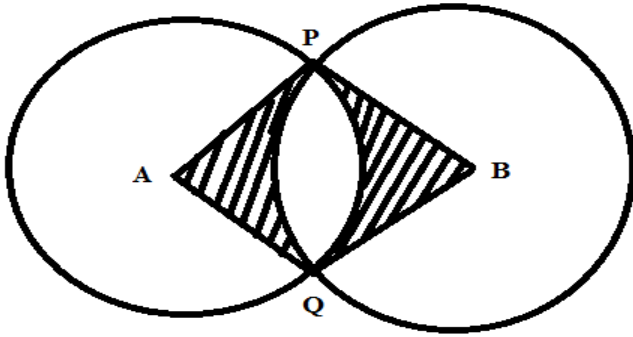Calculate:
(a) The total surface area of the solid. (6marks)

(b) The volume of the solid. (4marks)

21. The diagram below shows two circles, centre A and B which intersect at points P and Q. Angle PAQ = 70^0 and PBQ =

40^0 and PA = AQ = 8cm.

Use the diagram to calculate to two d.p
   a) The length PQ   (2marks)

   b) The length PB   (2marks)

   c) Area of minor segment circle centre A.   (2marks)

   d) Area of the shaded region.   (4marks)

22. The coordinates of a triangle ABC are   A(1, 1)   B(3, 1)   and   C (1, 3).
   (a) Plot the triangle ABC.   (1 mark)

   (c) ABC undergoes a reflection along the line X = 0, obtain the coordinates and plot on the graph points $A'B'C'$, under
        the transformation   (3 marks)
   (d) The triangle A' B' C', undergoes an enlargement scale factor -1, centre origin. Obtain the coordinates of the image
        A'' B'' C''   (3marks)
   (e) The triangle A'' B'' C'' undergoes a rotation centre (1, -2) angle 120^0. Obtain the coordinates of the image $A'''B'''C'''$
                                                                     (3 marks)

23. A matatu and Nissan left town A for town B 240km away at 8.00a.m travelling at 90km/hr and 120km/hr respectively.
     After 20 minutes the Nissan had a puncture which took 30 minutes to mend.
     a) How far from town A did the Nissan catch up with the matatu?   (6 marks)

     b) At what time did the Nissan catch up with the matatu?   (1 mark)

     c) At what time did the matatu reach town B?   (3 marks)

ASSIGNMENT 5

1. Evaluate (3 Marks)

$$\frac{-12\ 3 \times 4 - (-15)}{-5 \times 6\ 2 + (-5)}$$

2. Evaluate without using a calculator. (3 Marks)

$$\frac{(2\frac{3}{7} - 1\frac{5}{6}) \div \frac{5}{6}}{\frac{2}{3} of 2\frac{1}{4} - 1\frac{1}{7}}$$

3. Use logarithms to evaluate. (4 Marks)

$$\sqrt[4]{\frac{43.52 \times 0.08792}{785.3}}$$

4. Find the equation of the L_1 in the form y = mx + c which is perpendicular to the line 3y + 2x = 6 and passes through the point (-3, 4). (3mks)

5. The diagram below represents a prism of length 6cm whose cross-section is an equilateral triangle of sides 3cm. Draw a well labeled sketch of the net of the prism. (3 Marks)

6. The figure below represents a kite ABCD, AB = AD = 15 cm. The diagonals BD and AC intersect at O. AC = 30cm and AO = 12 cm. Find the area of the kite (3mks)
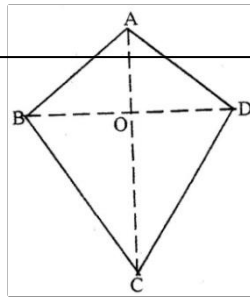
7. Mrs. Musyoka has Sh. 700 in Sh. 50 notes and Sh. 100 notes only. If she has a total of 11 notes find how many notes she has of each denomination. (3mks)

8.

9. Given that(3x-35) = coscos(x + 20). Find   x + 10) (3mks)

10. Without using a mathematical tables or a calculator evaluate $\sqrt{\dfrac{153 \times 0.18}{0.68 \times 0.32}}$.   (3mks)

11. Three bells ring at intervals of 9 minutes, 15 minutes and 21 minutes. The bells will next ring together at 11.00pm. Find the time the bells had last rung together. (3 Marks)

12. The surface areas of two similar bottles are 12cm^2 and 108cm^2 respectively. If the bigger one has a volume of 810cm^3. Find the volume of the smaller one.   (3 Marks)

13. In the figure below A'B' is the image of AB under rotation. By construction, find and label the centre O of the rotation. Hence, determine the angle of the rotation.(4mks)

14. Mr. Ombogo the principal of Chiga secondary would wish to cover the floor of the new administration block using the square tiles. The floor is a rectangle of sides 12.8m by 8.4m. Find the area of each of the largest tiles which can be used to fit exactly without breaking   (3mks)

15. The size of an interior angle of a regular polygon is (3x)° while the exterior angle is (x + 20)° . Find the number sides of the polygon   (3 Marks)
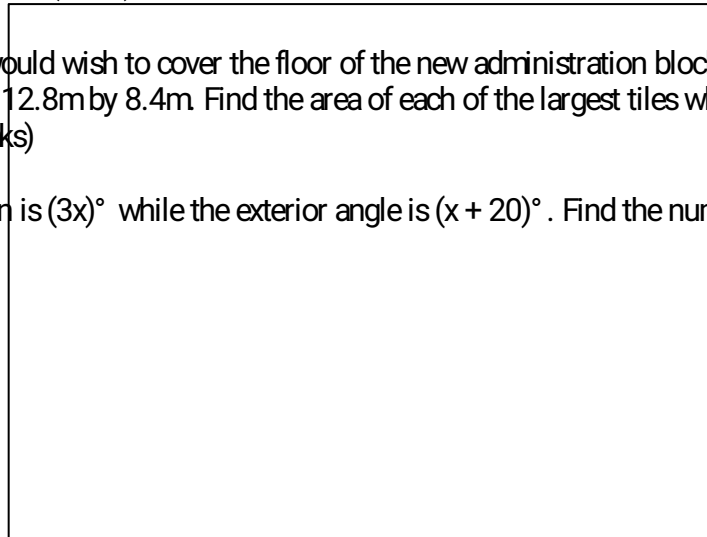
17. The vertices of quadrilateral OPQR are O (0, 0), P (2, 0), Q (4, 2) and R (0, 3). The vertices of its image under a rotation are O' (1, -1), P'(1, -3) Q'(3, -5) an R'(4, -1).
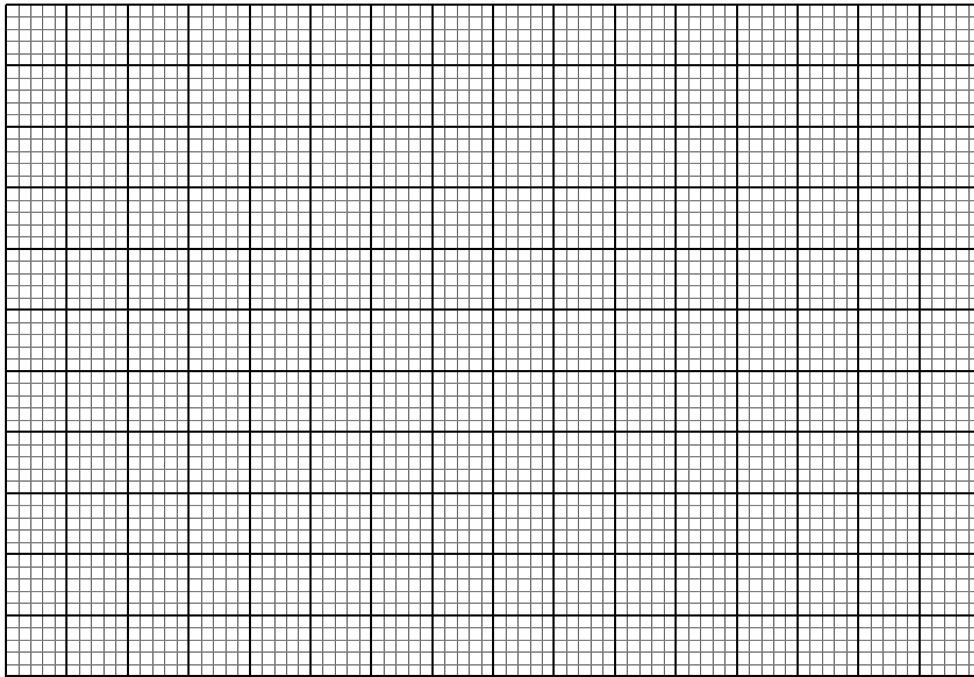
(a) (i) On the grid provided, draw OPQR and its image O'P'Q'R'   (2marks)
(b) (ii) By construction, determine the centre and angle of rotation.   (3marks)

(c) On the same grid as (a) (i) above, draw O''P'Q''R'', the image of O'P'Q'R' under a reflection in the line $y = x$
    (3marks)
(d) From the quadrilaterals drawn, state the pairs that are:
    (i)   Directly congruent;   (2marks)

    (ii)   Oppositely congruent   (2marks)

18. A slaughter house bought a number of goats at Sh. 2000 each and a number of bulls at Sh. 15000 each. They paid a total of Sh. 190,000. If they bought twice as many goats and three bulls less, they would have saved Sh. 5000.
    (a) If the number of goats and bulls bought were x and y respectively, write down two simplified equations involving the above information.   (2mks)

    (b) Solve the two equations above and hence find the number of each type of animals bought.   (4mks)
    (c) The slaughter house sold all the animals at a profit of 25% per goat and 30% per bull. Determine the total profit they made.   (4 Marks)

19. a) In a safari rally drivers are to follow route ABCDA. B is 250km from A on a bearing of 075^0 from A. C is on a bearing of 110^0 from A and 280km from B. The bearing of C from D is 040^0 and a distance of 300km. By scale drawing show the position of the point A, B, C and D. (4mks)

   b) Determine
   (i) The distance of A from C. (2mks)
   (ii) The bearing of B from C. (1mk)

   (iii) The bearing of A from D. (1mks)

   (iii) The distance A from D (2mks)

20. A saleswoman is paid a commission of 20% on goods sold worth over Ksh 100,000. She is also paid a monthly salary of Ksh 12,000. In a certain month, she sold 360 handbags at Ksh 500 each.
   (i) Calculate the saleswoman's earnings that month. (3 mks)

   (ii) The following month, the saleswoman's monthly salary was increased by 10%. Her to total earnings that month were Ksh 17, 600.
   Calculate the total amount of money received from the sales of handbags that month. (5mks)

   (ii) The number of handbags sold that month. (2 mks)

21. Using a ruler and a pair of compasses only, draw a parallelogram ABCD, such that angle DAB = 75^0. Length AB = 6.0cm and BC = 4.0cm.
   From point D, drop a perpendicular to meet line AB at N. (7 Marks)

   (i) Measure length DN. (1 Mark)

   (ii) Find the area of the parallelogram. (2 Marks)

22. Two cubes of length 5cm and 7cm are melted and cast into a single cube.
   Determine the:
   i. Volume of the new cube (3mks)
   ii. Length of the new cube correct to 1 decimal place(2mks)
   iii. Surface area of the new cube (2mks)
   b. Suppose that it was instead cast into a cylinder of radius 3.5 cm. what would the height be to the nearest cm?
   Take $\pi = \dfrac{22}{7}$, (3 mks)

23. The diagram below shows vertical telephone pole RS supported by wires SP and SQ pegged at points P and Q respectively on a level ground. Points P and Q are on the same straight line from the base R of the pole. The angles of elevation of S from P and Q are 33.9^0 and 48.2^0 respectively. Given that PR = 5 m, calculate:
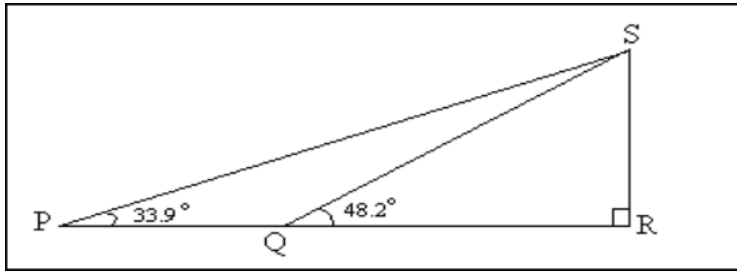
(a)   The distance QR   (4 marks)

(b)   The length of the wires SP and SQ   (4 marks)

(c) If the cost of the pole and labour is sh. 1600 and the cost of 1 meter of the wire is sh. 233. Find the total cost of the installation.   (2 marks)

24. A glass in the form of a frustum of a cone, is represented by the diagram below. The glass contains water to a height of 9 cm. The bottom of the glass is a circle of radius 2 cm while the surface of the water is a circle of radius 6 cm.
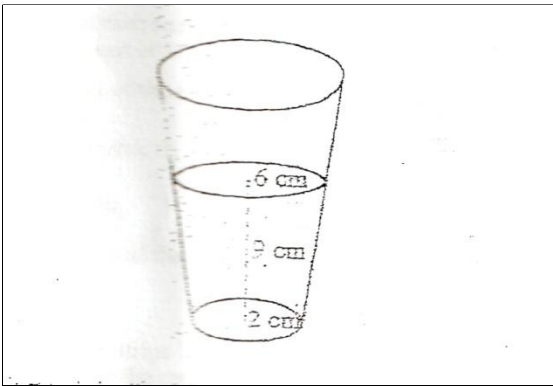

(a) Calculate the volume of the water in the glass.   (3Mks)

(b) When a special marble is submerged into the water in the glass, the water   level rises by 1 cm. Calculate:

(i) the volume of the marble   (4 marks)

(ii) the radius of the marble   (3 marks)

ASSIGNMENT 6

1. Arrange the following sets of numbers in descending order.   [2 Marks]
    404,044   440,440   440,404   404,444   444,044

2. Prove that 581,526 is divisible by both 9 and 11.   [2 Marks]
3. When a number is divided by either 36, 24 or 45, the remainder is always 5. Find the least value of.

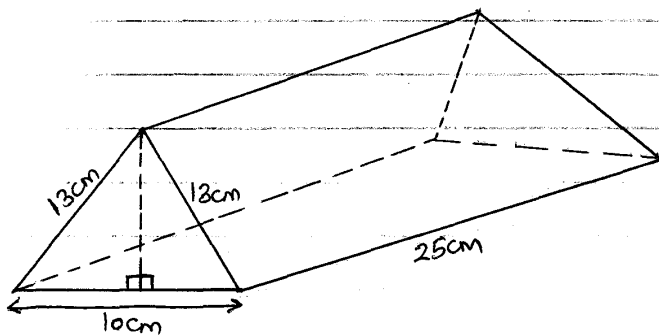[3 Marks]

4. Using mathematical tables, find the cubes of each of the following numbers. Leave your answer in standard form.
   a. 2341   [2 Marks]
   b. 0.00472   (2mks)
5. Use logarithms tables to evaluate;   [4 Marks]
6. Find the equation of a line that passes through (3, -5) and is perpendicular to a line whose equation is
                                                                              [3 Marks]
7. Two similar vases have their heights in the ratio 3:2. What is the ratio of
   i. Their surface areas   [1 Mark]
   ii. Their volumes   [1 Mark]
8. A rectangular container measuring 1.2m long, 70 cm wide and 55 cm high is half full of water. All this water is poured into an empty cylindrical tank of diameter 1.4 metres. Find the height to which the water rises.
                                    (4 mks)
9. In the triangle below, AB=12cm AC=13cm and ABC=BDC=90^0.
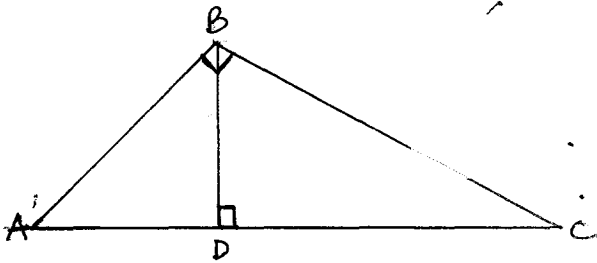
   Calculate;
   i. The length of BC   [2 Marks]
   ii. The length of BD   [2 Marks]
10. Express as a single fraction in the simplest form;   [3 Marks]
11. The ratio of boys to girls is 3:2. When of the boys and 6 girls are absent, the ratio remains the same. Find the number of students in the class.   [4 Marks]
12. The diagram below shows a triangular prism. Determine its total surface area. [3 Mark

13. The size of the interior angle of a regular polygon is and the exterior angle is
   0

   a. Calculate the value of   [2 Marks]
   b. How many sides does the polygon have?   [2 Marks]
14.
15. A triangle measures 16cm by 20cm by 24cm. calculate its area using the Hero's formula.
                                                                              [3 Marks]
16.

SECTION B (Answer any 5 questions)

17. The table below is a bus timetable for journeys between towns E and J via towns FGH and I. Use it to answer the questions that follow.

Town	Arrival	Departure
E		0500
F	0630	0645
G	0710	0720
H	0820	0830
I	1145	1230
J	1345	

   a. At what time does the bus leave town G in 12hr system.   [1 Mark]
   b. How long does it take between town E and G.   [1 Mark]
   c. In which town does the bus stop the longest and for how long?   [2 Marks]
   d. If the bus does not stop anywhere;
      i. How long would it take to travel from town E to town J.   [2 Marks]
      ii. At what time would it arrive at town J.   [1 Mark]
   e. If the distance between town G and J is 400km, calculate the average speed between G and J.   [3 Marks]

18. In a certain day secondary school in Vihiga County. There were 500 students. The ratio of boys to girls is 3:2.
   a. How many more boys than girls are there in the school?   [2 Marks]
   b. i.   One day 10% of the girls and two fifth of the boys went for music and drama festivals. How many students were left in the school?   [3 Marks]

      ii.   During the Festivals each student was given 100/= and the two accompanying teachers were given 1000/= each for lunch. What was the total expenditure?[2 Marks]
   c. On a certain morning, ½ of the boys and 0.75 of the girls were sent home for fees. Given that each student brought 2500/= the following day, calculate the total amount of money that was collected.   [3 Marks]

19. A line L_1 passes through (3, -2) and (5,4).
   a. Determine the gradient of line L_1 [1 Mark]
   b. The equation of line L_1 [2 Marks]
   c. Line L_1 cuts at point P and the at point Q. determine the co-ordinates of P and Q.   [4 Marks]
   d. Another line L_2 passes through (-3,7) and is perpendicular to L_1. Determine its equation.   [3 Marks]

20. a. Given that the ratio of the areas of two similar solids is 9:25
      i. What is the linear scale factor between the two solids?   [2 Marks]
      ii. If the length of the smaller solid is 1.2m, what is the length of the bigger solid?   [2 Marks]

b. The linear dimensions of a model car are   of the dimensions of the actual car.

   i. What is the area of the windscreen of the actual car if the windscreen of the model car is $3cm^2$?   [2 Marks]
   ii. If the capacity of the boot of the model car is $15cm^3$, find the capacity of the boot of the model car.
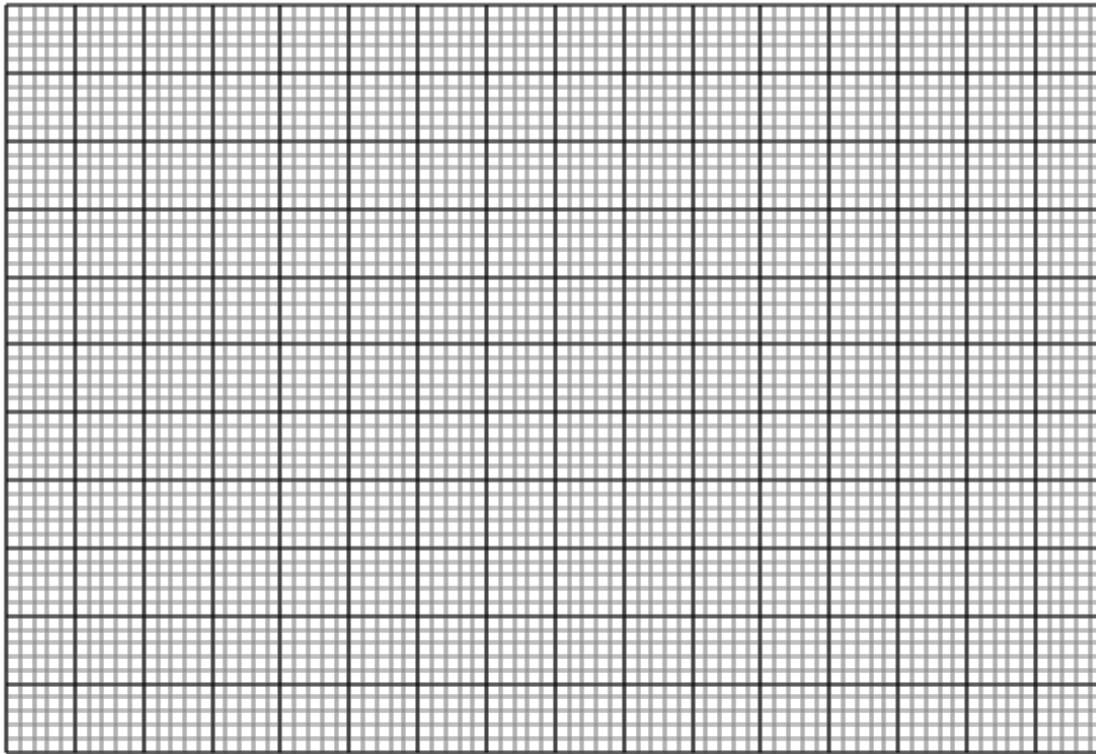
[2 Marks]

c. The volume of two similar jugs are in the ratio 8:125. What is the ratio of their surface areas?

[2 Marks]

21. A triangle PQR has co-ordinates P(1,1) Q (1,3) R (3,1)
    a. Plot the triangle in the graph paper provided.   [1 Mark]

    b. PQ'R' is the image of PQR under an enlargement scale factor 2 about origin.
       i. Plot PQ'R' in the graph provided.   [3 Marks]
       ii. State the co-ordinates of PQ'R'.   [1 Mark]
    c. P"Q"R" is the image of PQ'R' under reflection in the . Plot P"Q"R" in the graph paper and state its co-ordinates.
                                                                        [4 Marks]
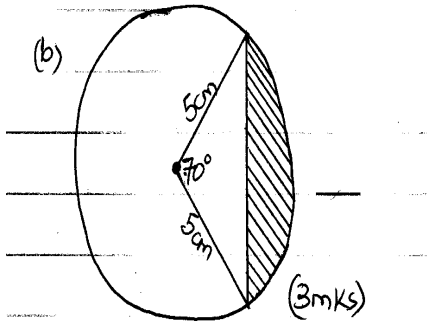   d. Calculate the area of triangle P'Q"R"   [1 Mark]
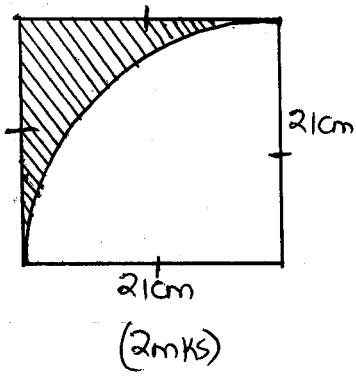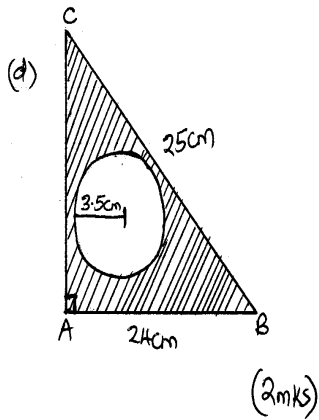22. In each of the following figures, calculate the area of the shaded regions.
    a.

(3mks)

b.

(b)

5cm

70°

5cm

(3mks)

c.

21cm

21cm

(2mks)

d.

(d)

C

25cm

3.5cm

A 24cm B

(2mks)
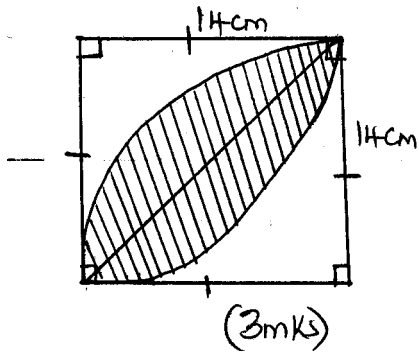
23. Amina bought 3 pens and 2 pencils for shs. 13. Njoki bought 2 similar pens and 1 pencil and spent shs. 5 less than Amina.
   a. Form 2 simultaneous equations to represent the above information [2 Marks]
   b. Using substitution method, determine the price of each item. [3 Marks]
   c. Migwi bought 100 pencils and 150 pens from the same shop.
      i. What was the total cost? [2 Marks]

      ii. He later sold all the pencils at a profit of 30% and all the pens at a profit of 50%. Determine the total profit.
                                    [3 Marks]
24. A bus has a carrying capacity of 52 passengers and a Nissan 14 passengers. Both vehicles were used to ferry people from a village to a church for a wedding function. The distance from the village to church is 80km and the fuel consumption of the bus is 1 litre for every 8km and the Nissan is 1 Litre for every 15 km. Fuel costs shs. 15 per litre. The bus made 5 complete round trips and the Nissan made 8 complete round trips with full capacity. If each passenger was paying shs. 100 to be ferried to the function; Find
      i.   The total collection made by each vehicle. [3 Marks]
      ii. The total cost of fuel used by each vehicle. [2 Marks]
      iii. The net profit made by each vehicle. [3 Marks]
      iv. The total number of people who were ferried to the function. [2 Marks]

12) **geography**