1. Express 18 and 42 each as a product of its prime factors and hence find their highest common factor (HCF).
2. Express $2.10303\ldots$ in the form $2\frac{a}{b}$, where a and b are integers.
3. In a geography test, the total mark scored by 6 students was 420. If the mean mark for the first 5 students was 68. Find the mark scored by the sixth student.
4. Solve the inequality $\frac{x+7}{5}-\frac{x+3}{6}\leq 1$ and show your solution on a number line.
5. The opposite angles of a cyclic quadrilateral are such that one of them is thrice the other. Find the values of each of the angles.
6. Solve the equation $(54\times 0.5)^{x}=\frac{1}{9}$
7. Simplify the expression $\frac{2x^{2}-5xy-3y^{2}}{(x-3y)}$
8. Given that f(x)=2√x +6,find the value of x for which f(x)=16
9. Find the equation of a line passing through point (0, -5) and is perpendicular to the line y + 3x = 1
10. Simplify the following as far as possible,

    $\log_2 4-\frac{1}{2}\log_3 8+\log_2 8$

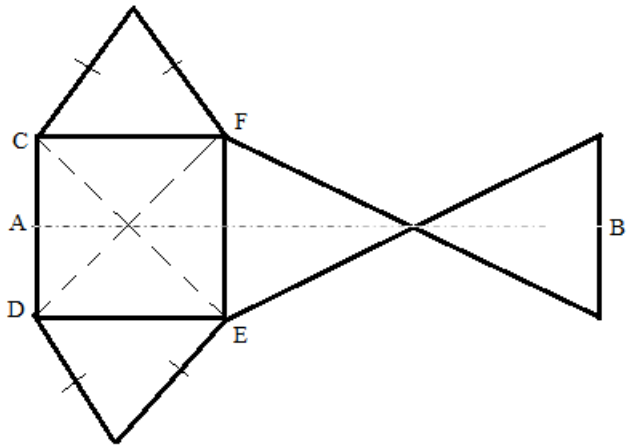
11. Given that position vector **OP** = $\begin{pmatrix}2\\3\end{pmatrix}$ and **OQ**= $\begin{pmatrix}4\\-1\end{pmatrix}$ Find the coordinates of the mid-point of vector **PQ**
12. Two similar conical flasks have heights of 32.4cm and 97.2cm. If the volume of the small flask is 3016cm³, find the volume of the big flask.
13. A tourist has US$ 1200 which he changes to Uganda shillings (Ug. Shs) at a rate of $1= Ug. Shs 3500. If he has a balance of Ug. Shs 900,000 after all expenses find;
    (a) the amount of money spent in Ug. Shs.
    (b) his balance in US dollars
14. The number of people who play football (F) or basketball (B) is twice the number of people who play F and B. If n(F) =9 and n(B) =6, how many play both games?

15. In a mathematics class the teacher told students to bring a pen (P), a graph book (G) and a ruler (R) for use. During the next lesson it was found out that only 16 students brought all the items. 5 students did not have any of the items. 13 did not have a pen, 14 did not have a graph book and 20 did not have a ruler. One student only had a pen, 2 students had only a graph book and no student had only a ruler.
    (a) Represent the above information on a Venn diagram
    (b) How many students
        (i) were in the class?
        (ii) had a pen and a ruler only?

    c) If a student is selected at random find the probability that he had;

        (i) at least 2 items.
        (ii) only one item

16. The diagram below shows a square CDEF with diagonals CE and DF each = $\sqrt{200}$ cm and four congruent isosceles triangles representing the net of a pyramid on a square base.



Given that AB = 46cm;
(a) Draw a sketch of the pyramid.
(b) Calculate the;
    (i) height of the vertex of the pyramid above the base
    (ii) length, DE
    (iii) surface area of the pyramid
    (iv) volume of the pyramid

17. (a) Calculate the simple interest on Shs. 990,000 for 8 months at a rate of 5 and $\frac{1}{2}$ per annum.

18. In a triangle OPQ point R lies on the line PQ such that **3PR =PQ**. Point S lies on a line **OQ** and **OS=** $\frac{1}{4}$ **OQ**, while T lies on line **OR** such that **OT=TR**. If **OQ=q** and **OP=p** express in terms of **p** and **q** the vectors.

(a) (i) PQ (ii) OR (iii) PT

(b) Show that **PT: TS= 2:1**

19. The table below shows masses of 35 newly borne babies in a hospital.

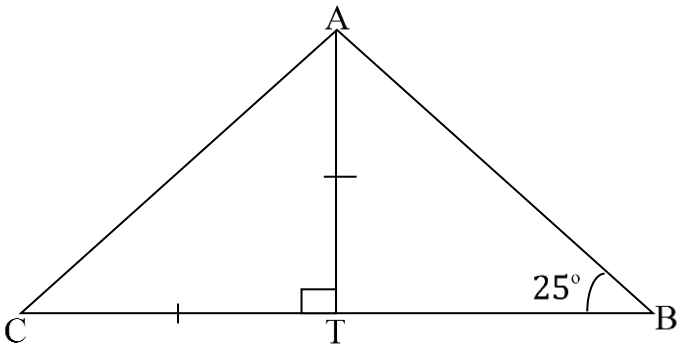
Mass	**x**	**f**	**d =(x-A)**	**fd**
2.0 – 2.4	2.2	5	-1.5	-7.5
2.5 – 2.9				-4.5
2.0 – 3.4		8		
3.5 – 3.9		9		
4.0 – 4.4				
4.5 – 4.9				
5.0 – 5.4		2		3.0
		$\sum f =$		$\sum fd =$

(a) Copy and complete the table.
(b) Using assumed mean of 3.7, determine the mean.
(c) Calculate the median.
(d) Draw a histogram for this data and use it to estimate the mode.

20. (a) A straight road runs uphill 400m inclined at 13^0 to the horizontal. Calculate the height of the hill.

(b) The hill is shown on a map scale of 1:100000. Calculate the length in cm of the line on the map representing the road.

(c) In the triangle ABC below, AT is perpendicular to BC, angle $\mathrm{ABT} = 25^{\circ}$. AT=TC and AC= 10cm Find the length of $\overline{\mathrm{AB}}$.



END