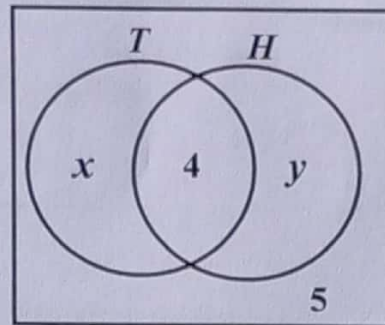


SECTION A: (40 marks)

Answer **all** questions in this section.

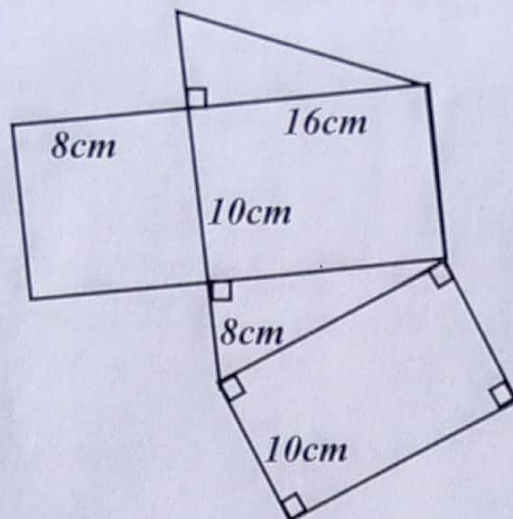
1. Express $\frac{\sqrt{5}-2}{\sqrt{5}+2}$ in a form $a + b\sqrt{c}$ where a , b and c are integers and hence find the values of a , b and c . (04 marks)
2. Find the equation of line passing through the mid point of AB where $A(-1, 2)$ and $B(5, -8)$ which is perpendicular to the line $y = 2x + 9$. (04 marks)

3. In the Venn diagram below, the number of Tennis players (T) is twice those playing Hockey (H)



- If 13 students play only one game, find $n(T \cap H)$.
4. A function $h(x) = 2x^2 + 5$, determine the values of a for which $h(a) = 23$ (04 marks)
 5. When Betty is offered a discount of 35% on a television, she pays shs 546,000. Calculate the market price of the television. (04 marks)
 6. A hemispherical bowl has capacity of $3\frac{1}{2}$ litres. Find its radius in centimetres. (04 marks)
 7. A point Q lies on the line $y = 12$ and it is 13 units from the origin. Determine the possible coordinates of Q . (04 marks)
 8. The representative fraction of a map is $\frac{1}{200,000}$, if a land of area 60km^2 is to be represented on this map, find the area of this land in cm^2 on the map. (04 marks)

9. The figure below is a cut out net of a wedge.



Draw the solid and find its volume

(04 marks)

CUT

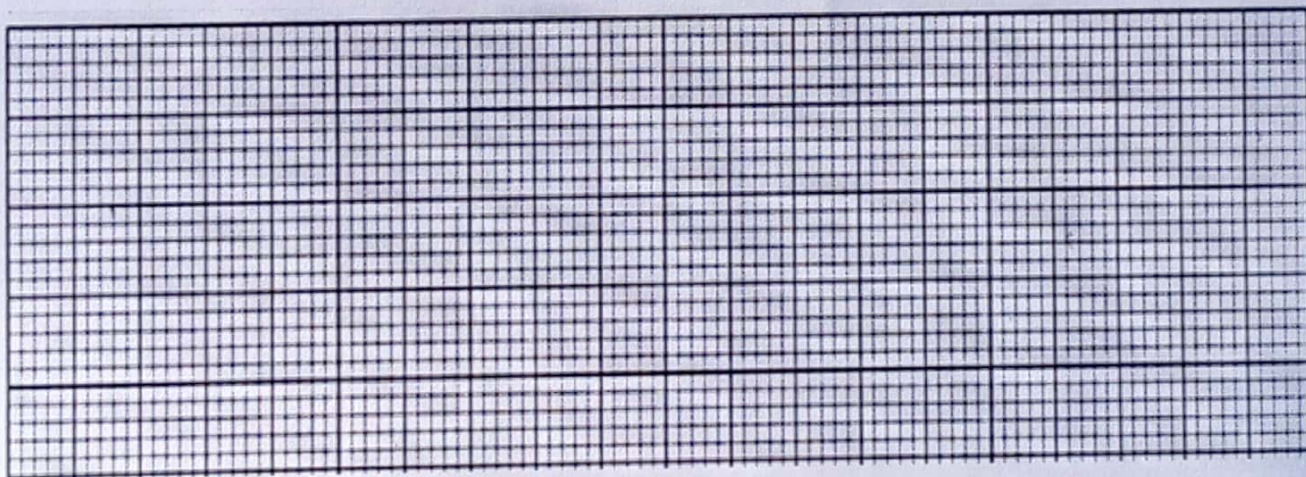


10. Hakim left home at 12:00pm and after an hour and a half of moving at a constant speed, he had travelled 44 miles, at which point he was stopped by traffic police man. After 3 hours of being stopped, he drove towards home at a constant speed, and it took him 2 hours in total to get home. Construct a distance time graph for Hakim's journey on the graph below.

(04 marks)

NAME.....Personal Number

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(Attach this cut page on your answer sheets, don't forget to include your **name** and **personal number**)

SECTION B: (60 marks)

Answer any **five** questions from this section. All questions carry **equal** marks.

11. (a) Simplify $\frac{2^{x+3} + 2^x}{2^{x+2} - 2^x}$. (05 marks)

(b) Use mathematical tables of logarithm to evaluate $\sqrt[4]{\left(\frac{5.89 \times 0.0821}{18.54}\right)}$. (07 marks)

12. In a certain class, the optional subjects are Political (*P*), Accounts (*A*) and French (*F*). From this class, 38 students take at least one of the optional subjects above. 5 take only *A*, 4 take only *P*, 8 take only *F*, 7 take all the three optional subjects. 21 students do not take *A*, 28 do not take *P* while, 17 do not take *F*.

Using a Venn diagram;

- (a) Determine the number of students who
- (i) do not take any of the optional subjects above,
 - (ii) take French,
 - (iii) are in the class. (10 marks)
- (b) If a student is picked at random from this class, find the probability that he takes Accounts but not Political. (02 marks)

13. The table below shows the rooms available each night and the charges at Ntoroki Hotel.

	Double room (for 2 people)	Single room (for 1 person)
Number of rooms available	78	42
Charges for each room	£83	£54

- (a) Calculate the greatest number of people the hotel can accommodate each night. On one particular night, 56 double rooms and 34 single rooms were occupied. (03 marks)
- (b) Express the total number of rooms occupied as the total number of rooms available in the hotel. Correct to two decimal places. (03 marks)

Turn Over

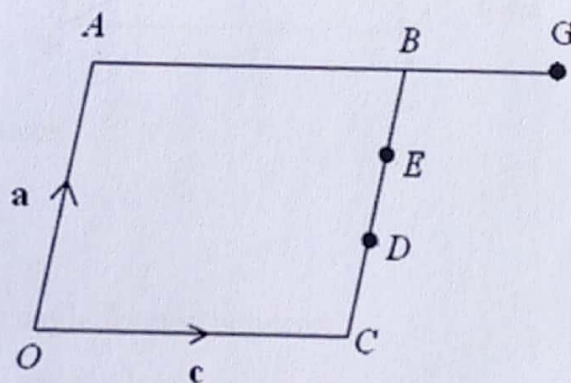
- (c) Express the number of people accommodated this night as a percentage of the greatest number the hotel can accommodate. (03 marks)
- (d) Calculate the total charge for the rooms occupied that night. (03 marks)

14. (a) A machine valued shs 2.4 millions depreciates at a rate of 25% per year. Find its value and the depreciation after 2 years. (05 marks)
- (b) A company pays monthly salary of shs 400,000 to its employees. It also gives employees commission upon sales as indicated in the table below;

Sales (U shs)	Commission (%)
First 200,000	18.0
Next 500,000	25.3
Any extra sales	30.2

Annet sold 80 items in a month at shs 10,000 each. Find her total income in that month. (07 marks)

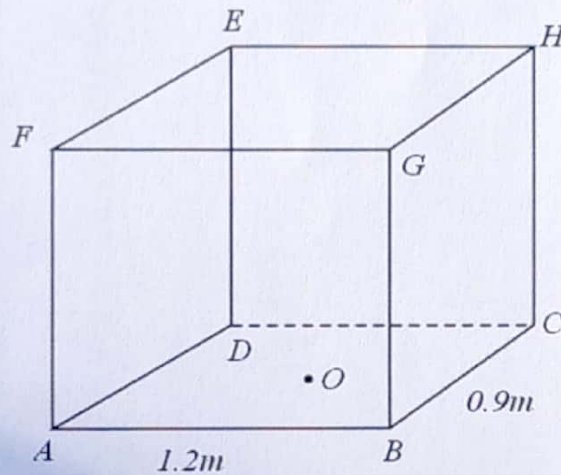
15. In the diagram below, $OABC$ is a parallelogram with $OA = a$, $OC = c$, $CD = DE$, $DE : CB = 1 : 3$ and $AB : BG = 2 : 1$.



- (a) Express in terms of a and c the vectors;
- DA ,
 - DG .
- (06 marks)
- (b) Show that O , E and G are collinear and hence find the ratio $OE : EG$. (06 marks)

16. (a) Two functions $f(x)$ and $g(x)$ are defined by $f(x) = 2x - 1$, $g(x) = ax + b$ and $gf(x) = 10x + 3$, find the;
- values of a and b ,
 - value of x for which $f(x) = g(x)$. (05 marks)
- (b) A function $h(x)$ has its inverse $h^{-1}(x) = \frac{x-5}{2x+3}$.
- Determine the;
- function $h(x)$,
 - value of $h(-1)$,
 - value of x for which $h(x)$ is meaningless. (07 marks)

17. The diagram below represents a cuboid $ABCDEFGH$ with $AB = 1.2m$, $BC = 0.9m$, $ADEF$ is a square and O is the point of intersection of AC and BD .



- Find the distances;
 - BE ,
 - OH . (05 marks)
- Determine the angle formed between;
 - line BE and the base,
 - plane BDH and the base. (04 marks)
- Calculate the capacity of the cuboid above in litres. (03 marks)

END