BEARING AND STATISTICS   SENIOR FOUR

1. Two points A and B 32 m part are at the same horizontal level. A tower FT stands north of A with FA horizontal. The angles of elevation of T from A and B are 45° and 30° respectively. Given that B is due east of A find

i) The height of the tower FT,
ii) The bearing of B from the tower.

2. The data below sows the height in centimeters of pupils in a certain school.

132	125	117	124	108	112	100
130	122	118	114	103	119	106
125	128	106	111	116	132	129
136	92	115	118	121	137	123
119	115	101	129	87	108	104
127	103	110	126	118	82	104
146	126	119	119	105	132	126

(i) Form a frequency distribution table for the data having equal interval size starting with 80 – 89.
(ii) Convert the distribution in (i) above to a cumulative distribution.
(iii) Draw an ogive the cumulative distribution and use it to find the median height.

3. The frequency distribution below shows the marks obtained in a physics examination by 2000 candidates.

Mark	Frequency
11 – 20	30
21 – 30	60
31 – 40	220
41 – 50	540
51 – 60	490
61 – 70	310
71 – 80	180
81 – 90	110
91 – 100	60

Calculate:
(i) The mean mark using an assumed mean of 55.5
(ii) The standard deviation
(iii) Median

4. The daily average temperature in degrees Celsius for 20 days of April 1987 at Kampala was recorded as

25	23	23	22	20
20	21	22	25	24
23	21	25	24	22
22	24	23	24	23

(i) State the modal temperature.
(ii) Find the mean temperature for the first 10 days.

5. A helicopter flies from Kampala due north for 400km. It then flies on a bearing of 285 for 280 km. From there it flies on a bearing of 090 for 400km.
Draw a sketch diagram to show the route of the helicopter. Hence draw an accurate diagram using a scale of 1cm to represent 50km.
From your diagram, find the distance and bearing of Kampala from the final destination of the helicopter.

6. A port B is 2.5km East of Port C. A navigator observes that the bearing of C from his ship is 310° and that of B is 018°. By an accurate scale drawing or otherwise; find the position and the bearing of the ship from B given that that the ship begins to sail at a speed of $10km^{-1}$ on the bearing of 241°. Find by drawing or otherwise the bearing and the position of the ship from C after 48 minutes.

7. The table below shows the frequency distribution of weights in kg of luggage for 100 passengers boarding the Uganda air lines plane traveling from Dubai to Entebbe.

Weight (kg)	Frequency
50 – 54	1
55 – 59	2
60 – 64	5
65 – 69	11
70 – 74	21
75 – 79	20
80 – 84	17
85 – 89	10
90 – 94	6
95 – 99	4
100 – 104	2
105 – 109	1

Find;
(i)   The mean weight
(ii)   The median weight
(iii) The model weight

8. Copy and complete the table below sowing the number of senior four candidates of a certain school who passed a zonal mock examination in mathematics.

Marks	x	f	fx
35 – 39	37	60	2220
40 – 44	____	72	____
45 – 49	47	____	3760
50 – 54	52	____	2600
55 – 59	__	48	____
60 – 64	____	35	____
65 - 69	____	____	2010
70 – 74	____	25	____
75 – 79	____	____	924
80 – 84	____	5	____
85 – 89	____	2	____
90 - 94	____	1	____
		$\sum f = 420$	$\sum fx =$

(a) State:
(i) the class width.
(ii) the modal class.
(b) If a distinction was awarded for a score of 70 or more marks, determine the percentage number of candidates who passed with distinctions.
(c) Calculate the mean mark.

9. . A plane flew west from Entebbe (E) at the speed of 200kmh^{-1} for $1\frac{1}{2}$ hours to reach Kasese (K). At Kasese it altered its course and flew North-East to Moroto (M) at 150km^{-1}. The total time when was in air was 5 hours.
(i) By using a scale drawing determine the distance and bearing of Entebbe from Moroto.
(*Use the scale 1cm to 50km*).
(ii) On its way to Moroto the plane passed over Soroti which is North of Entebbe. Estimate the distance between Soroti and Moroto.
(iii) If the plane flew back to Entebbe via Soroti at the speed of 200kmh^{-1}, determine the time it took to fly from Moroto to Entebbe.

10. . The following is a frequency table for the weights, in kg, of adult patients who visited a certain doctor in a certain week.

Weight (kg)	Frequency
50 -54	3
55 – 59	5
60 – 64	8
65 – 69	11
70 – 74	21
75 - 79	19
80 – 84	18
85 – 89	11
90 - 94	4

(i) Calculate the mean weight of the patients.
(ii) If the above data is representative of the type of patients that visit the doctor, find the probability that the weight of the first patient in the next week belonged to the model class.

11. An observer at a point A sees an object on a bearing of $100^{0.}$ Another observer at a point B sees the same object on bearing of 150^{0} given that the distances of the object from A and from B are equal, determine the bearing of A from B.

12. **.** The figure below show the marks in percentage obtained by candidates in an English test
43 70 50 35 64 62 50 53
46 62 65 83 59 54 58 64
52 54 32 59 48 54 35 48
40 58 64 40 71 74 55 70
72 48 75 45 55 40 57 55
i) Starting with 30 as the lower class limit of the first class and using equal class intervals of 5 marks, form a frequency distribution table for this data
ii) Plot a cumulative frequency curve for the data. Use your data to estimate the median mark
iii) Calculate the mean mark using an assumed mean of 57%

13.

Scores	Class mark	frequency	Freq x class mark
40-49	……	………	450
50-58	……	16	……..
59-67	63	………	1575
68-76	……	………	864
77-85	……	13	……..
86-94	90	4	360

The table above shows the number of students who passed an end of year English promotional examination in terms of mark scores.
a) Study the table and the information available to complete the missing details.
b) (i) State the class interval of the scores.

ii)Calculate the average score of the marks.
c) If all the above students were promoted and represented 4/5 of the class, find the number of students in the class who sat the examination.

14. The table below shows the marks scored in an English test marked out of 100 by student of S.2 in a certain school

Score	f(x)
0-19	2
20-39	6
40-49	12
60-79	9
89-89	1

i) Represent this information on a bar chart
ii)   Use the frequency table above to estimate median and mean mark score

15. The table below shows ages of 120 students entering senior one.

Age: years	No of students
12.5-12.9	8
13.0-13.4	35
13.5-13.9	52
14.0-14.4	17
14.5-14.9	8

a) State the i) class with
        ii) Modal class
b) Determine the mean and median age of the students.

16. . Three points A, B and C on the same horizontal level are such that B is 150 km from A on a bearing of 060^0. The bearing of C from A is 125^0. The bearing of C from B is 160^0.
(i) By scale drawing using 1 cm to represent 25 km find the distance of C from
(i) A
(ii) B
(ii)An aeroplane flies from A on a bearing of 340° at 300 kmh^{-1}. After 40 minutes of flying, the pilot changes course at point D and flies directly to C at the same speed. Include in your diagram in a) above the route of the plane. Hence find the
(i) Time (in hours) the plane takes to travel from A to C.

17. The following table shows the marks obtained in a mathematics test by S.5 students in a certain school.

50	53	31	56	38
33	39	51	38	41
69	57	63	50	54
40	41	45	48	64
59	61	55	36	52

(i)Using class internal of 5 marks, make a frequency distribution table starting with the
30 – 34 class.
(ii)Use your table in (i) above to estimate the mean mark. State the modal class.

18. Three towns A, B and C lie on the same level ground. Town B is 15km away from town C. The bearings of towns B and C from A are 060° and 150° respectively. The bearing of C from B is 200°. To a pilot flying an aircraft above A, the angle of depression of C is 7.5°. Calculate the:
(a) Distances $\overline{AB}$ and $\overline{AC}$.
(b) Vertical height of the aircraft above A.
(c) Angle of elevation of the aircraft from B.

19. The table below shows the marks scored by 90 students in the test marked out of 50 marks.

Marks	Frequency(f)

15 - 19	1
20 - 24	13
25 - 29	29
30 - 34	25
35 - 39	19
40 - 44	3

(a)Represent the above on a histogram. Use your histogram to estimate the mode.
(b)Calculate the mean mark of the test using a working mean of 27.

20. The table below shows the weight (in kg) of 40 students of a class and their corresponding cumulative frequencies.

Weight (kg)	Cumulative Freq.
30-34	2
35-39	7
40-44	12
45-49	21
50-54	28
55-59	34
60-64	38
65-69	40

a) Draw a cumulative frequency curve, use your graph to estimate the
Median weight of the students.
25th and 75th percentile weights
b) Calculate the mean weight of the students.

21. The bearing of tower A from point O is 060^0 and that of tower B from O, 200^0 $\overline{OA}$ =24 km and $\overline{OB}$ = 33 km. Tower C is exactly half way between towers A and B.

Using a scale of 1 cm to represent 5 km, draw an accurate diagram showing the positions of the towers.
Use you diagram to find:
Distances $\overline{AB}$ and $\overline{OC}$.
The bearing of tower B from tower A.
The bearing of tower C from O.
a)Find:

The average speed of a cyclist who takes $2\frac{1}{4}$ hours to travel directly from A to B.

How long it takes another cyclist to travel from A and B via O at a steady speed of 4.5kmh-¹ faster than that of the cyclist in c) i) above.

22. . The table below shows the marks obtained in a chemistry test by 54 students in certain school.

54	49	60	58	54
60	51	57	56	54
53	59	56	52	55
57	62	54	54	56
48	51	52	55	58
65	55	54	57	61

a)Using class width of 3 marks and starting with the class of 48-50 make a frequency distribution table.
b) Use your table to
(i) Draw a histogram.
(ii)Determine the median and mean mark.

23. . Town B is 100km away from town A on bearing of 135^0. Town D is on a bearing of 090^0 from town B, 124km apart. Town C 160 km away from town D is on bearing 030^0 from D.

Using a scale of 1cm to represent 20 km, make an accurate drawing to show the relative positions and distances to towns A, B, C, and D.
Determine the:
Shortest distance and bearing of town C from A.
Distance and bearing of town B from town C.

24. . Shown below are marks obtained by 50 candidates in a certain S.4 mathematic mock examination.

25	30	29	60	72	59	40	40	62	70
40	39	62	65	40	59	39	43	80	21
58	29	19	25	30	32	56	59	40	55
69	90	81	50	31	45	60	20	51	49
31	30	56	58	50	50	50	60	40	70

(a) (i) Construct a grouped frequency table having class intervals of 10 mark, beginning with the $15 - 24$ class group.
ii) Use your grouped frequency table to calculate the mean mark of the mock examination.
(b) Represent the above results on a histogram and use it to estimate the mode.

25. A helicopter left Kampala at 0600 hours and flew on bearing of 090^0 at a velocity of $300 kmh^{-1}$. It landed at Nairobi airport at 0830hours. At exactly 0900 hours, it left Nairobi airport and flew on a bearing of 340^0, at the same original velocity. It then landed at Kitgum Airstrip at 1200 hours. Using graphical construction and a scale of 1cm: 100km, find the:
a) Distance of Kitgum from Kampala,
b) Bearing of Kampala from Kitgum.

26. The table below shows the weight in kilograms of 28 children sampled in a Primary School:

Weight (kg)	Number of children
15-19	2
20-24	4
25-29	7
30-34	3
35-39	5
40-44	6
45-49	1

a) State the modal class

b) (i) Calculate the cumulative frequency and hence, estimate the median weight correct to one decimal place.
ii) Calculate the mean weight of the children
iii) Find the probability that a child selected at random from the school weighs 40 kg and above.

27. A group of students obtained the following marks in a Math test.
28 35 94 78 70 56 57
58 60 76 77 62 84 66
67 68 69 70 51 64 73
74 75 61 62 54 80 83
88 90 41 47 64 70 75
a) (i) Form a grouped frequency table for the data starting from the Class $20-29$.

   (ii) Represent the marks obtained in the Math test on a bar chart