1. Scale Drawing

1. Three mountains Mikai, Kembo and Chaka in a village are situated in such a way that Kembo is 900m on a bearing of 120^0 from Mikai. Mt. Chaka is 1200m on a bearing of 030^0 from Kembo.
   (i) Draw a sketch showing the position of the three mountains (1 mk)
   (ii) Calculate the distance of Mt. Chaka from Mt. Mikai (2 mks)
2. Shopping centres XY and Z are such that Y is 12km south of X and Z is 15kn from X. Z is on a bearing of $N30^0W$ from Y. Calculate and give compass bearing of Z from X. (4mks)
3. Four telephone posts PQR and S stand on a level ground such that Q is 28m on a bearing of 060^0 from P. R is 20m to the south of Q and S is 16m on a bearing of 140^0 from P.
   (a) Using a scale of 1cm represent 4m show the relative positions of the posts. (4mks)
   (b) Find the distance and bearing of R from S. (3mks)
   (c) If the height of post P is 15.6m. on a separate scale drawing, draw a diagram and determine the angle of depression of post R from the top of post P. (3mks)
   (Same scale as above)
4. Alice chepchumba on her cycling practice cycled on a bearing of 120^o for 5.5km, then on a bearing of 200^o for 8km finally he turned northwards for 13.5km, by scale drawing determine her final position from starting point. (4 marks)
5. A surveyor recorded the measurement of field in a field book using lines AB = 260m as shown below.

	B	
	130	R40
	70	Q10
	50	P20
S50	10	
	A	

   a) Use a suitable scale to draw the map of the field. (2 marks)
   b) Find the area of the field. (2 marks)
6. (a) In a Safari rally drivers are to follow route ABCGA. 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 140^0 and at a distance of 300km. By scale drawing, show the position of the point A, B, C and D. (4 mks)
   (b) Determine
   (i) Distance of A from C (2 mks)
   (ii) The bearing of B from C (1 mk)
   (iii) The distance and bearing of A from D (3 mks)
7. Town X is 20km in the direction 060^o from Y and Z is 30km in the direction 150^o from Y. Using the scale 1cm represents 5km, find by scale drawing;
   (a) the bearing of Y from Z
   (b) the distance of X from Z (4mks)

8. A field was surveyed and its measurements recorded in a field book as shown below.

	F	
	100	
E 40	80	
	60	D 50
C 40	40	
	20	B 30
	A	

(a) Using a scale of 1cm to represent 10m, draw a map of the field. (4mks)

(b) Calculate the area of the field.

(i) in square metres. (4mks)

(ii) in hectares. (2mks)

9. A plane leaves town P to town Q on a bearing of 130^0 and a distance of 350km. it then flies to town R 500km away and on a bearing 060^0. Find by scale drawing the distance of R from P (3mks)

10. A surveyor recorded the following information in his field book after taking measurements in metres of a plot. The baseline is the straight line AH = 300m.

	H	
40 to F	250	100 to G
120 to D	200	
	180	80 to C
	100	60 to B
	A	

(a) Using a scale of 1cm to represent 20m, draw an accurate diagram of the plot. (5mks)

b) Use your diagram to calculate the actual area of the field in hectares (5mks)

11. Three town P,Q and R are such that P is on a bearing of 120° and 20 km from Q. Town R is on bearing of 220^o and 12km from P

a) Using a scale of 1 cm to 2 km, draw and locate the positions of the three towns. (3mks)

b) Measure

i) the distance between Q and R in kilometres. (2mks)

ii) the bearing of P from R. (1mk)

iii) the bearing of R from Q. (2mks)

c) Calculate the area of the figure bounded by PQR. (2mks)

12. The area of a forest on a map whose scale is 1:50,000 is $17cm^2$. Calculate the area of the forest in hectares. (2 mks)

13. Four towns P, Q, R and S are such that town Q is 120km due east of town P. Town R is 160km due North of town Q. Town S is on a bearing of 330^{o} from P and on a bearing 300^{o} from R. use a ruler and a pair of compasses only for all your constructions.
    a) Using a scale of 1cm to represent 50km, construct a scale drawing showing the positions P, Q, R and S. (6 mks)
    b) Use the scale to determine
        i. The distance from town S to town P. (1 mk)
        ii. The distance from town S to town R. (1 mk)
        iii. The bearing of town S from town Q. (2 mks)

14. The actual area of an estate is 3510 hectares. The estate is represented by a rectangle measuring 2.6cm by 1.5cm on the map whose scale is l:n. Find the value of n (3 mks)

15. The following measurements were recorded in a field book of a farm in metres (xy = 400m)

	y	
	400	
C60	340	
	300	120 D
	240	100 E
	220	160 F
B 100	140	
A 120	80	
	x	

a) Using a scale of 1cm representing 4000 cm, draw an accurate map of the farm.

b) If the farm is on sale at Kshs.80,000.00 per hectare, find how much it costs. (10 mks)

16. Four points A, B, C and D are situated on a horizontal plane such that B is 250 m on a bearing of 070^{0} from A. C is 325 m on a bearing of 150^{0} from B. D is due west of C and on a bearing of 210^{0} from B. (6 marks)
    a) Using a scale of 1 cm to 50 m draw an accurate drawing to show the position of A, B, C and D.
    b) Use your scale drawing fo find the :
        I. The distance between A and D (2 marks)
        II. The bearing of A from D (2 marks)

17. Town **X** is 13.5km from town **Y** on a bearing of $028^{o.}$ A matatu leaves **y** at 7:35a.m towards a bearing of 080^{o}. The matatu is at point **Z** due south of **X** at 8:55a.m
    (a) Calculate the average speed of the matatu from **Y** to **Z**
    (b) If the matatu continues on the same bearing, calculate the distance it covers from **Z** when it is East of **X**

18. Three towns X, Y and Z are such that Y is 500km on a bearing of 315^{o} from X. Z is on a bearing of 230^{o} from X. given that the distance between Y and Z is 800km.
    (a) using a scale of 1cm to represent 100km, draw a scale diagram to show the position of the Towns
    (b) Find the bearing of;
        (i) X from Z
        (ii) Z from Y
    (c) Use the scale drawing to find the distance from X to Z

19. Two aeroplanes **S** and **R** leave an airport at the same time. **S** flies on the bearing of 240^o at 750Km/h while **R** flies due East at 600Km/hr..

(a) (i) Calculate the distance of each aeroplane after 30minutes

(ii) Using a scale of 1cm to represent 50km make an accurate scale drawing to show the positions of the aeroplanes after 30minutes

(b) (i) Use the scale drawing to find the distance between the two aeroplanes after 30minutes

(ii) If each aeroplane landed after 30minutes and **S** received a signal to join **R** in 45minutes. Find its speed

(c) Determine the bearing of :

(i) **S** from **R**

(ii) **R** from **S**

20. The table below gives a field book showing the results of a survey of a section of a piece of land between A and E. All measurements are in metres.

	E	
D33	95	
	90	**F** 36
C21	70	
B 42	30	**G** 25
	25	**H** 40
	A	

(a) Draw a sketch of the land.

(b) Calculate the area of this piece of land.

21. Three towns A B and C are situated such that town A is 40km from B on a bearing of 280^o. C is 60km from B on a bearing of 130^o. Another town D is only 10km from C on a bearing of 210^o.

(a) Drawing accurately and using a scale of 1cm to 10km find the:-

(b) Distance from A to C and the bearing of A from C

(c) (i) Distance of B from D

(ii) Distance of A from D

(iii) Bearing of A from D

(iv) Bearing of C from D

22. A train left Naivasha for Nakuru at 1000hours. It traveled at an average speed of 45km/h and reached Gilgil after 40minutes. It then covered the remaining 50km in 1½ hours. A second train left Nakuru for Naivasha at 1015 hours and arrived at Gilgil at the same time as the first train arrived at Nakuru.

a) Using a scale of 1cm to represent 10minutes in the time axis and 1cm to represent 10km on the distance axis, draw on the same axes the graphs to show the movement of the two trains

b) use your graph to find;

i) the distance between Naivasha and Nakuru

ii) the time at which the train met

c) calculate the average speed, in km/h of the second train

23. On a certain map, a road 20km long is represented by a line 4cm long. Calculate the area of a rectangular plot represented by dimensions 2.4cm by 1.5cm on this map – leaving your answer in hectares

24. A port **B** is on a bearings of 080^o from a port **A** and at a distance of 95km. a submarine is stationed at a port **D**, which is on a bearing of 200^o from **A**, and a distance of 124km from **B**.

A ship leaves **B** and moves directly southwards to an island **P**, which is on a bearing of 140^{o} from **A**. the submarine at **D** on realizing that the ship was heading for the island **P**, decides to head straight for the island to intercept the ship.

(a) Using a scale of 1cm to represent 10km draw a diagram to show the positions of A,B,D, and P

(b) Hence;

Determine;

(i) the distance from **A** to **D**

(ii) the bearing of the submarine from the ship when the ship was setting off from B

(iii) the bearing of the island **P** from **D**

(iv) the distance the submarine had to cover to reach the island P

25. Use a scale of 1cm represents 50km in these questions. Five towns **A, B, C, D** and **E** are situated such that **A** is 200 km from **B** on a bearing of 050° from **E**. **C** is 300 km from **B** on a bearing of 150° from **B**. **D** is 350km on a bearing of 240° from **C**. **E** is 200km from **D** and the bearing of **D** from **E** is 100°

a) Draw the diagram representing the positions of the towns

b) From the diagram, determine;

i) The distance in km of A from E

ii) The bearing of D from B

26. Four towns **P, Q, R** & **S** are such that **P** is 280 km North of **R, S** is190 km from **R** on a bearing of 310^{o} and **Q** is 240 km from **P** on a bearing of 105^{o}.

a) Using scale of 1 cm rep. 50 km, locate the four towns.

b) Find; (i) distance **SQ**.

(ii) Bearing of **S** from **Q**.

(iii) The shortest distance between **P** and side **QR.**

27. Four ships are at sea such that a streamliner S is 150km on a bearing of 025° from a cargo ship **C**. A trawler **T** is 300km on a bearing of 145° from the cargo ship and a yacht **Y** is due West of **C** and on a bearing of 300° from **T**.

a) Using a scale of 1cm= 50km, draw on accurate scale drawing showing the positions of S, C, T and Y

b) By measurement from your scale drawing determine:

i) The distance and bearing of Y from S

ii) The distance ST

iii) The distance YT

28. A tea farm in Kakamega forest was surveyed and the results were recorded in the surveyors note book as shown below. The measurements are in meters

	250	**Y**
	240	D70
C80	170	
	70	B60
A60	50	
X	**0**	

Using a scale of 1: 25, draw the map of the plot and hence calculate the area of the plot in Hectares

29. The information below shows the entries in a surveyor's field book after a survey of a farm. XY = 280m is the baseline. All measurements are in metres

	280	**Y**
B 105	230	110E

A 100	190 160 90 40	45E 95G
X	O	

(a) Use a scale of 1cm represents 20m to draw the map of the farm
(b) Estimate the area of the farm in hectares
(c) If the point **Y** lies due north of **X**, find correct to 1 decimal place, the :
(i) Bearing of **E** from **X**
(ii) Distance of **E** from **X**

30. The measurements of a flower garden were recorded in a surveyor's field book as shown.

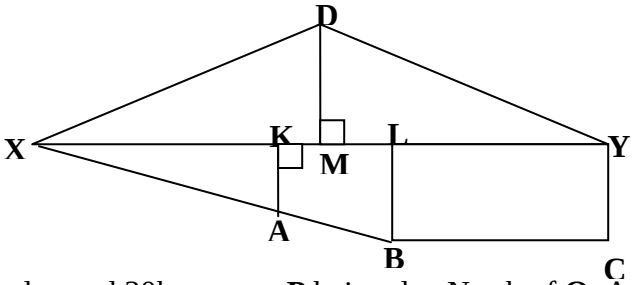
	250	Y
C80	240 170 70	D 70 B 60
X	0	

Draw a sketch of the field and find its area. (Measurements are in m)

31. A map has a scale 1:40,000:
(a) Calculate the distance between two points on the ground if the corresponding distance shown on the map is 3.25cm
(b) Calculate the area in the map of woodland which occupies 36ha on the ground

32. Three scouts John, Peter and Samwel stand on three adjacent peaks of equal altitude on mountain range. The distance between John and Peter is 800metres and the bearing of Peter from John is 020^{o}. The distance between John and Samwel is 1500metres, and the bearing of Samwel from John is 320^{o}.
(a) Calculate the bearing of John from Peter
(b) **Calculate**:- (i) the distance
(ii) the bearing of Samwel from Peter

33. The figure below represents a surveyor's sketch of a plot of land. Calculate the area of the plot in square metres given that XY = 50m, XK = 20m, XM = 25m, XL = 35m, KA = 40m, MD = 38m and LB = YC = 60m.



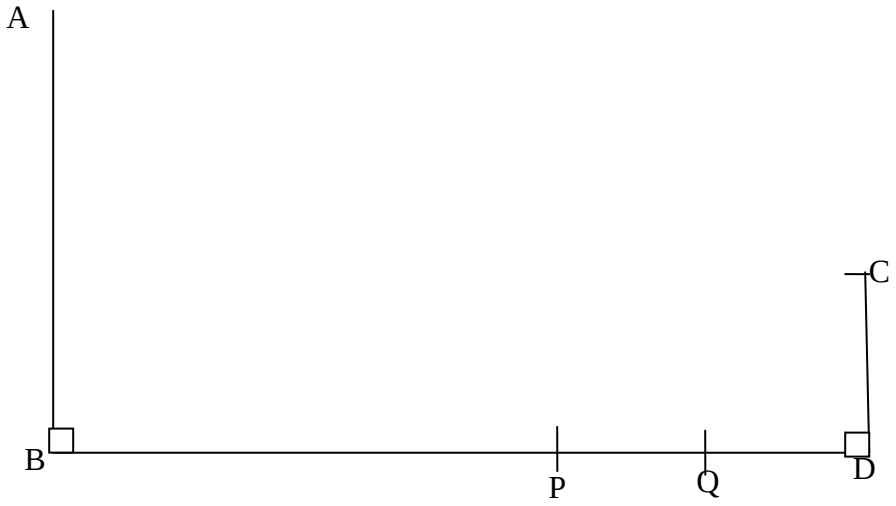
34. Two boats **P** and **Q** are located 30km apart; **P** being due North of **Q**. An observer at **P** spots a ship whose bearing he finds as S 56^{o}E from **Q**, the bearing of the same ship is 038^{o}. Calculate the distance of the ship from **Q** to 2 decimal places

35. A map is drawn to scale of 1:100,000. What area in km^2, is represented by a rectangle measuring 4.5cm by 5.4 cm

36. Two places **A** and **B** are 900km apart on the earth's surface. If **A** is due North of **B** and given that the latitude of **A** is 5^{o}N. Find the latitude of **B**. (Take radius of the earth to be 6370km)

37. A car starts from rest and build up a speed of 40m/s in 1min 40seconds. It then travels at this steady speed for 5minutes. Brakes are then applied and the car is brought to rest in 2minutes.
(a) Draw a velocity-time graph to show the journey
(b) Use your graph to find;
(i) the initial acceleration
(ii) the deceleration when the car is brought to rest
(iii) the distance traveled

38. The diagram below represents two vertical watch-towers AB and CD on a level ground. P and Q are two points on a straight road BD. The height of the tower AB is 20m and road BD is 200m



(a) A car moves from B towards D. At point P, the angle of depression of the car from point A is 11.3^{o}. Calculate the distance BP to 4 significant figures
(b) If the car takes 5 seconds to move from P to Q at an average speed of 36km/.hr. Calculate the angle of depression of Q from A to 2 decimal places
(c) Given that QC = 50.9m, calculate;
(i) the height of CD in metres to 2 decimal places
(ii) the angle of elevation of A from C to the nearest degree

39. Town B is 180 km on a bearing of 050^{0} from town A. Another town C is on a bearing of 110^{0} from town A and on a bearing of 150^{0} from town B. A fourth town D is 240 km on a bearing of 320^{0} from A. Without using a scale drawing, calculate to the nearest kilometer.
(a) The distance AC
(a) The distance CD