NAME _____   **INDEX NUMBER**   _____

SCHOOL _____   **DATE**   _____

APPLIED GEOMETRY AND BEARINGS

KCSE 1989 – 2012 Form 1 Mathematics	Working space
1. **1989 Q8 P1** A town P is 200 km West of Q. Town R is at a distance of 80km on a bearing of 049^0 from P. Town S is due East of R and due North Of Q. Determine the bearing of S from P (4 marks)	

2. **1993 Q22P1**
A route for safari rally has five sections AB, BC, CD, DE and EA. B is 200 km on a bearing 050^0 from A.C is 500km from B. The bearing of B from C is 300^0. D is 400km on a bearing 230^0 from c. E is 250km on a bearing 025^0 from d. Using the scale 1cm for 50km draw the diagram representing the route for the rally.
From the diagram determine
   (i) The distance in km of A from E
   (ii) The bearing of E from A (8 marks)	

			Working space
3.	**1995 Q4 P1** Manyatta village is 74 km North West of Nyangata village. Chamwe village is 42 km west of Nyangate. By using an appropriate scale drawing, find the bearing of Chamwe from Manyatta (2 marks)		
4.	**1995 Q21 P2** A part B is on a bearing of 080^0 from a port A and at a distance of 95 km. A submarine is stationed at a port D, which is on a bearing of 200^0 from AM and a distance of 124 km from B. A ship leaves B and moves directly southwards to an island P, which is on a bearing of 140^0 from A. The submarine at D on realizing that the ship was heading from the island P, decides to head straight for the island to intercept the ship Using a scale 0f 1 cm to represent 10 km, make a scale drawing showing the relative positions of A, B, D, P. (2 marks) Hence find (i) The distance from A to D (2 marks) (ii) The bearing of the submarine from the ship was setting off from B (1mark) (iii) The bearing of the island P from D (1 mark) (iv) The distance the submarine had to cover to reach the island P (2 marks)		

		Working space

5.	**1996 Q20 P2**
	Four towns R, T K and G are such that T is 84 km directly to the north of R, and K is on a distance of 295^0 from R at a distance of 60km. G is on a bearing of 340^0 from K and a distance of 30km**.**
	
	Using a scale of 1cm to represent 10km, make an accurate scale drawing to show the relative positions of the towns. Find:
	 (a) the distance and the bearing of T from K
	            (2 marks)
	 (b) the distance and the bearing of G from T
	            (2 marks)
	 (c) the bearing of R from G (1 mark)	

6.	**1997 Q23 P2**
	Two aeroplanes, S and T, leave airport A at the same time, S flies on a bearing of 060^0 at 750 km/h while T flies on a bearing of 210^0 at 900km/h.
	
	(a) Using a suitable scale, draw a diagram to show the positions of the aeroplanes after two hours.
	
	(b) Use your diagram to determine
	  (i) the actual distance between the two aeroplanes
	            (2 marks)
	 (ii) the bearing of T and S (1mark)
	 (iii) the bearing of S and T (1mark)	

		Working space
7.	**1998 Q22 P2** Two aeroplanes P and Q leaves an airport at the same time. P lies on a bearing of 240^0 at 900 km/ h while Q flies due east at 750 km/ h. (a) Using a scale of 1 cm to represents 100km, make a scale drawing to show the position of the aeroplane after 40 minutes. (b) Use the scale drawing to find the distance between the two aeroplane after 40 minutes. (c) Determine the bearing (i) P from Q (ii) Q from P	
8.	**2002 Q22 P2** Using the scale: 1cm represents 10km, construct a diagram showing the positions of B, C, Q and D. Determines the: i) Distance between B and C ii) Bearing of D from B.	

9.	**2003 Q19 P2**
	A ship leaves port p for port R though port Q.Q is 200 km on a bearing of 220^0 from P.R is 420 km on the bearing of 140^0 from from Q.
	
	    a) Using the scale 1:4,000,000, draw a diagram, showing the relative positions of the three ports P,Q, and R.
	
	    b) By further drawing on the same diagram, determine how far R is to the west of p
	
	    c) If the ship has sailed directly from P to R at an average speed of 40 knots, find how long it would have taken to arrive at R.
	    (Take 1 nautical mile = 1.853 km)	

10.	**2004 Q19 P2**
	For electricity posts, A, B, C, and D stand on a level ground such that B is 21 m on a bearing of 060^0 from A, C, is 15 m to the south of B and D is 12 m on a bearing of 140^0 from A.
	
	  (a) (i) Using scale of 1 cm of I cm to represents 3 metres, draw a diagram to show the relative positions of the posts
	    (ii) Find the distances and the bearing of C from D
	
	  (b) The height of the post at A is 8.4m. On a separate scale drawing, mark and determine the angle of depression of the foot of the post at C from the top of the top of the post at A.	

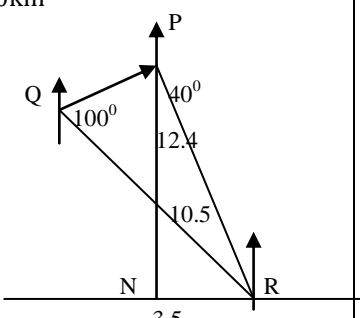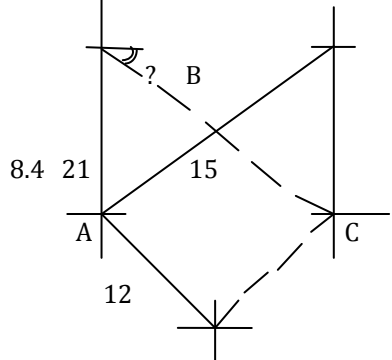|		Working space

11.	**2009 Q23 P1**
	Three points P,Q and R are on a level ground Q is 240 m from P on a bearing of 230◦ R is 120 m to the east of P.
	
	(a) Using a scale of 1 cm to represent 40m, draw a diagram to show the positions of P,Q and R in the space provided below. (2 marks)
	
	(b) Determine
	          (i) the distance of R from Q; (2 marks)
	          (ii) the bearing of R from Q (2 marks)
	
	(c) A vertical post stands at P and another one at Q.A bird takes 18 seconds fly directly from the top of the post at Q to the top of the post at P. Given that the angle of depression of the post at P from the top at Q is 9◦,
	
	Calculate;
	 (i) the distance to the nearest centre the bird covers;
	                                                              (2 marks)
	 (ii) the speed of the bird in Km/h (2 marks)	

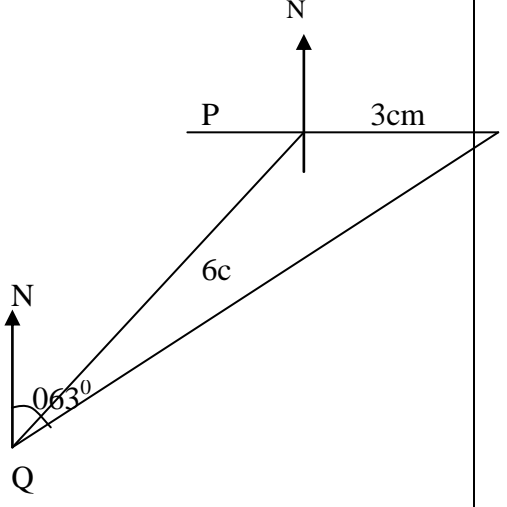|		Working space

12.	**2010 Q20 P1**
	The boundaries PQ, QR, RS and SP of a ranch are straight lines such that: Q is 16 km on a bearing of 040^0 from P;R is directly south of Q and east of P and S is 12 km on a bearing of 120^0 from R.
	
	Using a scale of 1 cm to represent 2 km.Show the above information in a scale drawing. (3marks)
	
	  (a) From the scale drawing determine:
	      (i) The distance in kilometres of P from S.
	      (ii) The bearing of P from S.	

13.	**2011 Q15 P1**
	Three posts x, y and z are such that y is 50km on a bearing of 060^0 from X while Z is 70km from Y and on a bearing of 300^0 from X.
	
	  (a) Using a suitable scale, drawing a diagram to represent the above situation. (3marks)
	
	  (b) Determine the distance, in km, of Z from x. (1 mark)	

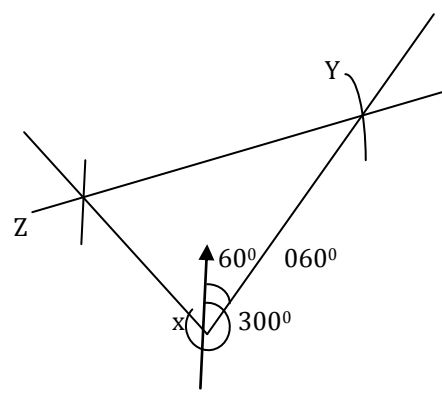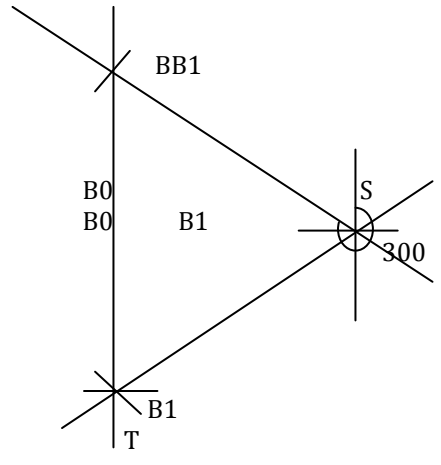|		Working space

14.	**2012 Q23 P1**
	Three pegs R, S and T are on the vertices of a triangular plain field. R is 300m from S on a bearing of 300^0 and T is 450m directly south of R.
	  (a) using a scale of 1cm to represent 60m, draw a diagram to show the positions of the pegs.
	
	  (b) Use the scale drawing to determine:
	    (i) the distance between T and S in metres; (2 marks)
	    (ii)the bearing of T from S. (1 mark)
	
	  (c)Find the area of the field, in hectares, correct to one decimal place. (4 marks)	

APPLIED GEOMETRY – BEARINGS MARKING SCHEME

1.	Scale: 1cm rep 20km thus ≡4cm and 200km ≡10cm Bearing of s from p is $075^0 \pm$ (or N75^{0}E) **1989Q8**	4M
2.	Scale: 1cm rep 50km(**must be used**) (i)Distance AE = 8.3[$\pm$ 0.1] X 50 $\qquad$ = 415[$\pm$ 5]km (ii)bearing of E from A = $112^0 \pm$ 10[ors68^0] **1993Q22**	8M
3.	Scale: 1cm rep 50km(**must be used**) Bearing of Chamwe from Manyatta is the angle shown by the arrow = 169 $\pm1^0$[ors11^{0}E] **1995Q4**	3M
4.	Scale: 1cm rep 50km(**must be used**) (i) Distance AD = 4.6[$\pm$5]X10 = 46[$\pm$1] km (ii) bearing of D from B = 240^0 or S60^{0}W (iii) Bearing of the island P from D =[$\pm$1]0 $\qquad$ [or S58^{0}E] (iv) Distance = 12.7 $\qquad$ [$\pm$1]X10=127[$\pm$1]km	2M
5.	(a) 131 + 49 = 180^0 (b) $\frac{180}{360}$ x $\frac{22}{7}$ x 2 x 6370 cos36 $\qquad$ = 16,196.18km	

	(c) $\frac{x}{360}$ x $\frac{22}{7}$ x 2 x 6370 cos 36 = 840 $x = \frac{840 \times 9}{11 \times 91 \times 0.8090} = 9.34$ Town C longitude = 131^0 – 9.34^0 $\qquad\qquad$ = 121.66^0W **1996Q20**	
6.	Bearing of 060^0 drawn Bearing of 210^0 drawn Distance on scale drawing Representing 1500km Representing 1800km (b) (i) Actual distance $\qquad$ (16 $\pm$ 0.1) x 200 or equivalent $\qquad$ = 3200km $\quad$ (ii) bearing of T from S (iii) bearing of S from T $\qquad$ = $044^0 \pm 1^0$ **1997Q23**	B1 B1 B1 B1 M1 A1 B1 B1 8marks
7.	(a) 600km and 500km seen or used $\quad$ Scale used $\quad$ Bearing and distance of P $\quad$ Bearing and distance of Q (b) PQ =10.6 $\pm$ 0.1 $\quad$ = 1060 $\pm$ 10km (c) (i)$254^0 \pm 1^0$ $\quad$ (ii)0740 ± 1^0 **1998Q22**	B1 S1 B1 B1 B1 B1 B1 B1 B1 8marks
8	a) √Scale used √Position of B √Position of C √Mediator of BQ or QC of BC	S1 B1 B1 B1 B1

	Mediator and D identified	B1
	b) i) Distance B to C = 73 + 1km	B1
	ii) North line at B + 2⁰ → 2^0	B1
	bearing = $102^0 + 1^0$ OR $s78^0e + 1^0$	
	2002Q22	8 marks
9.	1 cm rep 40km Time = $\dfrac{496}{1.853 \times 40}$ =6.691 hr **2003Q19**	
10.	**2004Q19**	

11.	a). Direct and distance of Q from P Direction and distance of R from P	B1
	b). i). Distance conversion	B1
	8.5 x 40	
	= 340	M1
	ii). Northline at Q	A1
	Bearing 0630 stated	B1
	c). i). Distance from the top of the post at Q to the top of post at P	B1
	X = 240 or x Cos 90 = 240	M1
	Cos 90	A1
	= 243m	
	ii). Speed 4 bird	M1
	$\dfrac{243 \times 60 \times 60}{1000 \times 18}$	A1
	= 48.6km/h	10 marks
	2009Q23	
12.	b) i) Distance of P from s =10. 8 + 0.1cm	B1
	ii) < PSN = 74 + 10	B1
	earing of P from S = 286 + 10	B1
		A1
	c) area of PQR = $\dfrac{1}{2}$ x 10.2 x 12.2	M1
		M1
	= 63.44km^2	B1
	Area of PRS = $\dfrac{1}{2}$ x 10.2 x 2 sin-60^0	
	= 30.6km2	
	Area of ranch PQRS	
	= 62.22 + 30.6	
	= 92.82km^2	
	2010Q20	

13		
	Distance XZ = 3 x 10 = 30km **2011Q15**	
14. (a)		
	√location of R √Location of T completeΔ	B1 B1 B1
	Distance TS:(6.6 ± 1)cm Conversion 6.6 x 60 = 396m	B1 B1
(b) (i)	Bearing of T from S $180 + 41^0(\pm 1^0) = 221 \pm 1^0$ 541^0w	B1 B1
(ii)	Area of field $<$TRS $60^0\pm$	M1

(c)	Area = ½ x 300 x 450sin60⁰
	
	 $= \underline{58456.71476}$
	    10000
	  = 5.8ha 5.7 5.9 **2012Q23**
		M1
		
		 A1
		 10