TRIGONOMETRY (II)

KCSE 1989 – 2012 Form 3 Mathematics	Working Space

1.

1989 Q13 P1

Two sides of a triangular field are 21 m and 32 m long. Its area is 240m^2**.** The angle between two sides is obtuse. Determine this angle. (3 marks)

2.

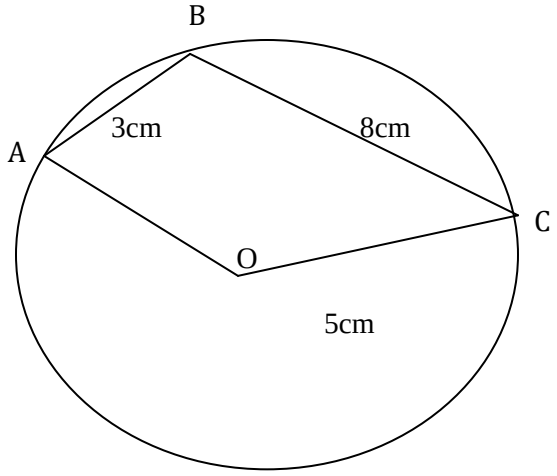
1990 Q19 P2

Two sides of a triangular plot of land are 52m and 28m. Given that the angle between these two sides is an obtuse angle and that the area of the plot is 576m^2, find the perimeter of the plot.
(8marks)

3.

1991 Q7 P1

In the figure below AB and BC are chords of a circle, centre O. AB = 3cm, BC = 8cm and OC = 5cm. Calculate angle ABC. (3 marks)



4.

1991 Q14 P2

Three towns P, Q and R are such that Q is 40 km on the bearing of 290^0 from P. Town R is directly to the south of P. The distance between Q and R is 60km. Find the bearing of Q directly from R. (4 marks)

5.

1992 Q16 P1

A ship P is due south of a lighthouse L. A ship Q is 4.8km due east of L. The bearing of Q from P is 030^0. P sails directly towards Q. Find the distance of P from L when its bearing from L is 110^0.

6.

1994 Q7 P1

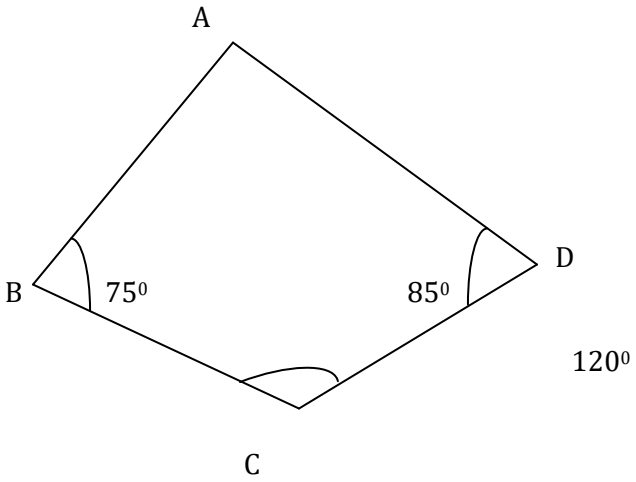
A man walks 5km on a bearing of 315^0 from a point A and then walks due south to a B point which is 8km from A. Calculate the bearing of B from A . (4 marks)

7.

1995 Q 22 P1

The figure below represents a plot of land ABCD, where BC = CD = 60 metres, < BCD = 120^0 < ABC = 75^0 and

< ADC = 85^0



(a) Calculate the distance from B to through D. (5 marks)

(b) The plot is to be fenced using poles that are 3 metres apart except at corner A, where the two poles next to the corner pole are each less than 3 metres from Calculate the distance from the pole at corner at corner A to each of the poles next to it. (3marks)

8.

1995 Q 20 P2

A hillside is in the form of a plane inclined at an angle of 30^0 to the horizontal. A straight section of road 800 metres long lies along the line of greatest slope from a point A to a point B further up the hillside.

(a) If a vehicle moves from A and B, what vertical height does it rise?

(b) D is another point on the hillside and is on the same height as B. Another height straight road joins and D and makes an angle of 60^0 with AB. C is a point on AD such that AC = ¾ AD.

Calculate

(i) The length of the road from A to C

(ii) The distance of CB

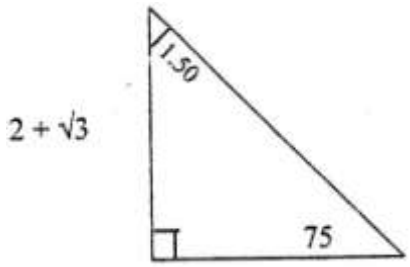
(iii) The angle elevation of B and C

9.	**1999 Q18 P1** A triangle plot of land ABC is such that AB= 34 m, AC=66m and BAC = 96.7^0 (a) Calculate the length of BC (b) In order to subdivide the plot, a fencing post P is located on BC such that BP: PC = 1:3. Calculate the area of the plot ABC and hence find the area of the triangular subdivision APB. (c) A water pipe running though the subdivision APB is parallel to AB and divides the area in the ratio 4:5 where the bigger portion is a trapezium. Calculate the distance of the pipe from P.
10	**1999 Q 18 P2** A tower is on a bearing of 030^0 from a point P and a distance of elevation of the top is 15^0 and the angle of depression of the foot of the tower is 1^0. a) Find the height of the tower b) A point Q is on the same horizon plane as point P. The tower is on a bearing 330^0 from Q and at a distance of 70 m (i) the area of the plot (ii) the size of <ABC
11	**2000 Q 8 P1** Shopping centers X, Y and Z are such that Y is 12 km south of X and Z is 15 km from X.Z is on a bearing of 330^0 from Y. Calculate the bearing of Z from X
12	**2000 Q 17 P1** A triangular plot ABC is such that AB = 36m, BC = 40m and AC = 42 m a) Calculate the: (i) Area of the plot in square metres (ii) Acute angle between the edges AB and BC (b) A water tap is to be installed inside the plot such that the tap is equidistant from each of the vertices A, B and C. Calculate the distance of the tap from the vertex.
13	**2000 Q 19 P2** A rally car traveled from point R to point S. S is 128 km on a bearing 060^0 from R. The car then set off S at 9.30 am towards T at an average of 150 km/h. It was expected at T at 11.30 am. After traveling for 1 hour and 20 minutes. It broke down at point P. The bearing of T and P from S is 300^0. a) Calculate the: (i) Distance from R to P (ii) Bearing of P and R (b) The repair took 10 minutes and the car set off to complete its journey to T. Find the speed at which car must now move to reach T on time.

14

2001 Q 13 P2

Given that $\tan 75^o = 2 + \sqrt{3}$, find without using tables $\tan 15^0$ in the form $p+q\sqrt{m}$, where p, q and m are integers.



15

2001 Q 17 P2

A helicopter is stationed at an airport H on a bearing 060^o and 800km from another airport P.A third airport is J is on bearing of 140^0 and 1,200km from H.

a) Determine:

i) Value of P

ii) The bearing of P from J

b) A jet flying at a speed of 1035 km/h left J towards P.

The helicopter at H also took off towards P at the same time. Find the speed at which the helicopter will fly so as to arrive at P,12 minutes later than the jet

16

2002 Q 13 P1

Given that $\sin a = \frac{1}{\sqrt{5}}$ where a is an acute angle find,

without using mathematical tables:

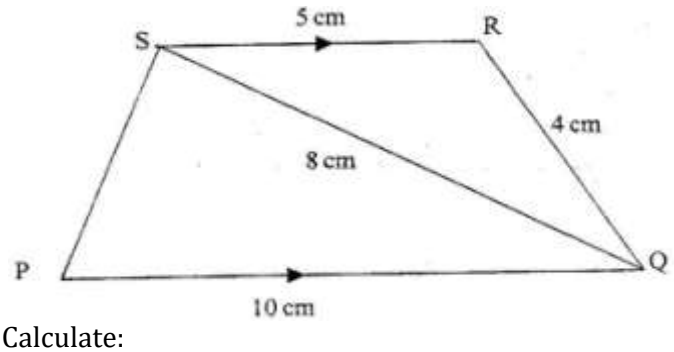
a) cos α in the form of $a\sqrt{b}$, where a and b are rational numbers (2 mks)

b) tan (90-α) (1 mk)

17

2004 Q 12 P1

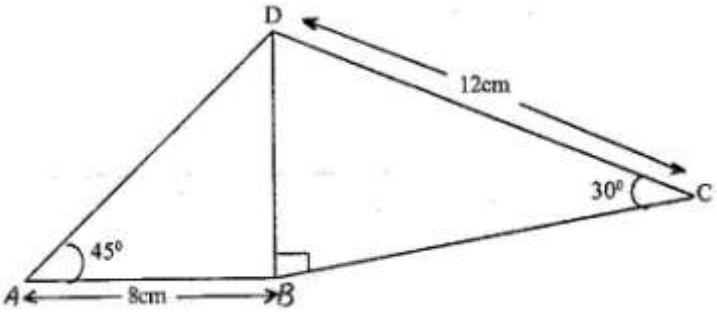
In the figure below PQRS is a trapezium with SR parallel to PQ. SR = 5cm, RQ = 4cm, QS = 8cm and PQ = 10cm.



Calculate:

a) The size of angle QSR

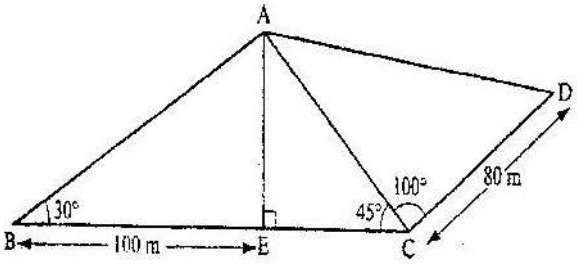
b) The area of triangle PQ

18	**2004 Q 23 P1** A triangular plot ABC is such that the length of the side AB is two thirds that of BC. The ratio of the lengths AB:AC = 4:9 and the angle at B is obtuse. a)The length of the side BC b) i) The area of the plot ii) The size of <ABC
19	**2005 Q 14 P1** The figure below shows a quadrilateral ABCD in which AB = 8 cm, DC = 12 cm, < BAD = 45^0, < CBD = 90^0 and BCD = 30^0.  Find: (a) the length of BD (1 mark) (b) The size of the angle ADB (2 marks)
20	**2005 Q 22 P2** A boat at point x is 200 m to the south of point Y. The boat sails X to another point Z. Point Z is 200m on a bearing of 310^0 from X, Y and Z are on the same horizontal plane. a) Calculate the bearing and the distance of Z from Y (3 marks) b) W is the point on the path of the boat nearest to Y. Calculate the distance WY (2 marks) c) A vertical tower stands at point Y. The angle of point X from the top of the tower is 6^0 calculate the angle of elevation of the top of the tower from W (3 marks)

21 **2006 Q 21 P1**

The figure below represents a quadrilateral piece of land ABCD divided into three triangular plots The lengths BE and CD are 100m and 80m respectively.

Angle ABE = 30^0 ∠ACE = 45^0 and ∠ ACD = 100^0



Find to four significant figures:

(i) The length of AE (2 marks)

(ii) The length of AD (3 marks)

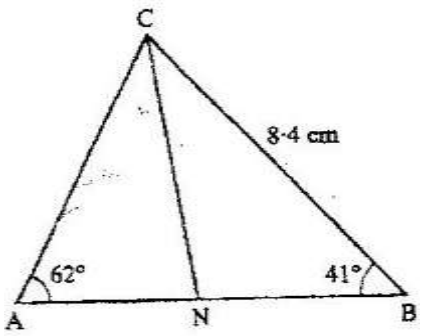
(iii) the perimeter of the piece of land (3 marks)

(b) The plots are to be fenced with five strands of barbed wire leaving an entrance of 2.8 m wide to each plot. The type of barbed wire to be used is sold in rolls of lengths 480m.

Calculate the number of rolls of barbed wire that must be bought to complete the fencing of the plots (2 marks)

22 **2007 Q 10 P1**

In the figure below ∠A = 62^0, ∠B = 41^0, BC = 8.4 cm and CN is the bisector of ∠ ACB.

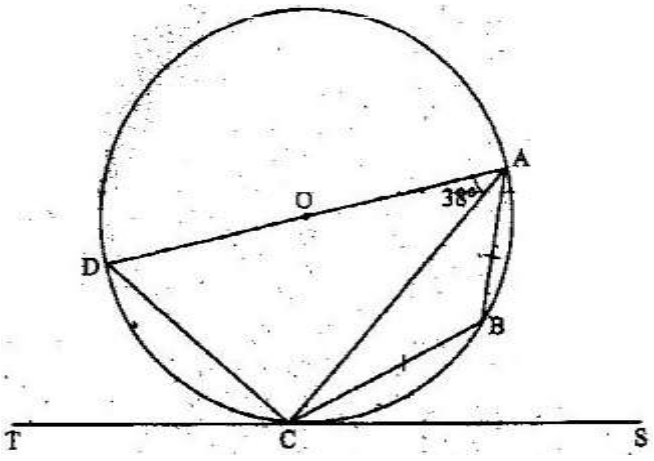


Calculate the length of CN to 1 decimal place. (3 marks)

23

2008 Q 20 P2

In the figure below DA is a diameter of the circle ABCD centre O, radius 10cm. TCS is a tangent to the circle at C, AB=BC and angle DAC= 38^0



a) Find the size of the angle;

(i) ACS; (2mks)

(ii) BCA (2mks)

b) Calculate the length of:

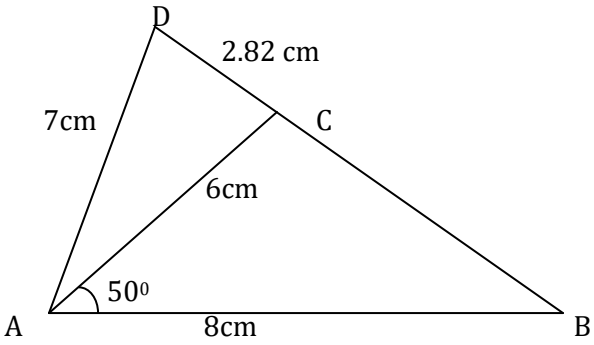
(i) AC (2mks)

(ii) AB (4mks)

24

2009 Q 17 P1

In the figure below (not drawn to scale) AB=8cm, AC=6cm, AD= 7cm, CD=2.82cm and angle CAB = 50°



Calculate to 2 decimal places:

(a) the length BC (2 marks)

(b) the size of angle ABC; (3 marks)

(c) the size of angle CAD ; (3 marks)

(d) the area of triangle ACD (2 marks)