

NAME \_\_\_\_\_ INDEX NUMBER \_\_\_\_\_

SCHOOL \_\_\_\_\_ DATE \_\_\_\_\_

## TRIGONOMETRY

<i>KCSE 1989 – 2012 Form 2 Mathematics</i>		Working Space
1.	<p><b>1989 Q4 P1</b> When the angle of elevation of the sun is <math>58^\circ</math>, a vertical pole casts a shadow of length 5m on a horizontal ground. Find the height of the pole</p> <p>(2marks)</p>	
2	<p><b>1990 Q12 P1</b> The angle of elevation of the top of a cliff from point P is <math>45^\circ</math>. From a point Q which is 10m from P towards the foot of the cliff, the angle of elevation is <math>48^\circ</math>. Calculate the height of the cliff.</p> <p>(4marks)</p>	
3	<p><b>1990 Q12 P2</b> Towns A,B,C and D are such that A is 15km north of B,C is 8km east of B,D is directly east of A and on a bearing <math>060^\circ</math> from C. Find the distance between towns A and D, giving your answer to two significant figures (3marks)</p>	

		Working Space
4	<p><b>1994 Q23 P2</b></p> <p>A flag post 10m long is fixed on top of a tower. From a point on horizontal ground, the angles of elevation of the top and bottom of the flag post are <math>40^\circ</math> and <math>33^\circ</math> respectively.</p> <p>Calculate</p> <p>(a) The height of the tower (6marks)</p> <p>(b) The shortest distance from the point on the ground to the top of the flag post (2marks)</p>	
5	<p><b>1996 Q4 P1</b></p> <p>A man walks directly from point A towards the foot of a tall building 240m away. After covering 180m, he observes that the angle of the top of the building is <math>45^\circ</math>. Determine the angle of elevation of the top of the building from A. (3 marks)</p>	
6	<p><b>1997 Q5 P1</b></p> <p>There are two signposts A and B on the edge of the road. A is 400 m to the west of B. A tree is on a bearing of <math>060^\circ</math> from A and a bearing of <math>330^\circ</math> from B. Calculate the shortest distance of the tree from the edge of the road.</p>	

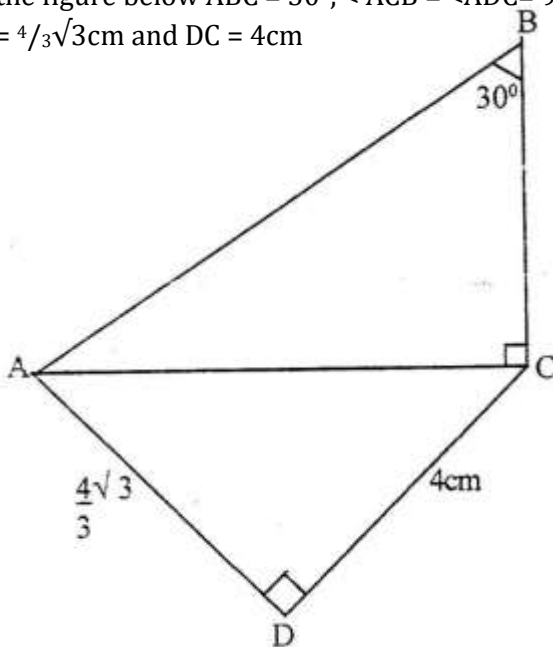
7 **1998 Q6 P1**

A point A is directly below a window. Another point B is 15 m from A and at the same horizontal level. From B angle of elevation of the top of the bottom of the window is  $30^\circ$  and the angle of elevation of the top of the window is  $35^\circ$ . Calculate the vertical distance.

- (a) From A to the bottom of the window  
 (b) From A to the bottom to top of the window  
 (c) From the bottom to the top of the window

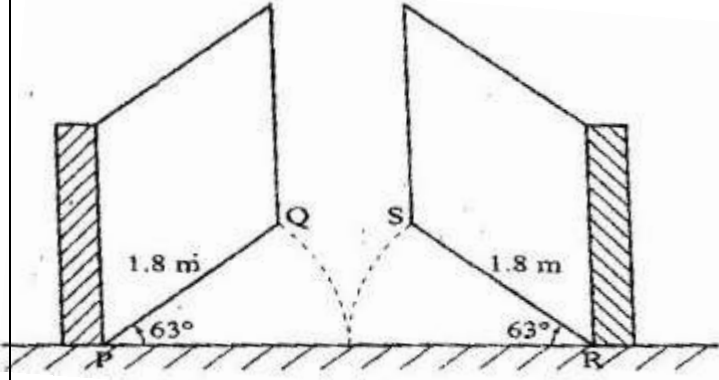
8 **1998 Q4 P2**

In the figure below  $\angle ABC = 30^\circ$ ,  $\angle ACB = \angle ADC = 90^\circ$ ,  
 $AD = \frac{4}{3}\sqrt{3}\text{cm}$  and  $DC = 4\text{cm}$



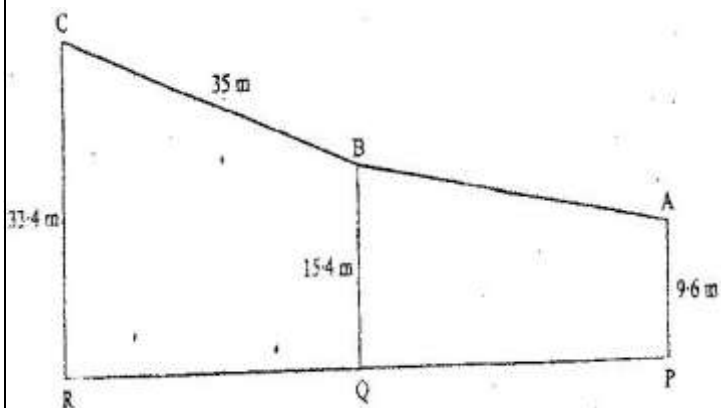
Calculate the length of (a)  $AC$   
 (b)  $BC$

		Working Space
9	<p><b>2000 Q7 P1</b>            Given that <math>\sin \theta = \frac{2}{3}</math> and <math>\theta</math> is an acute angle find:            (a) <math>\tan \theta</math> giving your answer in surd form</p>	
10	<p><b>2001 Q20 P2</b>            An electric pylon is 30m high. A point S on top of the pylon is vertically above another point on the ground. Points A and B are on the same horizontal ground as R. Point A is due south of the pylon and the angle of elevation of S from A is <math>26^\circ</math>. Point B is due west of the pylon and the angle of elevation of S from B is <math>32^\circ</math>.</p> <p>a) Distance from A and B (6marks)            b) bearing B from A (2marks)</p>	
11	<p><b>2003 Q12 P1</b>            Two straight paths are perpendicular to each other at point p. One path meets a straight road at point A while the other meets the same road at B. Given that PA is 50 metres while PB is 60 metres. Calculate the obtuse angle made by path PB and the road.</p>	

		Working Space
12	<p><b>2005 Q7 P1</b>            Given that <math>\sin (90 - x)^\circ = 0.8</math>, where <math>x</math> is an acute angle, find without using mathematical tables the value of <math>\tan x^\circ</math>.</p>	
13	<p><b>2006 Q11 P1</b>            The diagram below represents a school gate with double shutters. The shutters are such opened through an angle of <math>63^\circ</math>. The edges of the gate, PQ and RS are each 1.8 m</p>  <p>Calculate the shortest distance QS, correct to 4 significant figures ( 3 marks)</p>	
14	<p><b>2007 Q8 P1</b>            Given that <math>x</math> is an acute angle and <math>\cos x = \frac{2\sqrt{5}}{5}</math>, find without using mathematical tables or a calculator, <math>\tan (90 - x)^\circ</math>.</p>	

- 15 **2007 Q15 P1**  
Points L and M are equidistant from another point K.  
The bearing of L from K is  $330^\circ$ . The bearing of M from K is  $220^\circ$ . Calculate the bearing of M from L

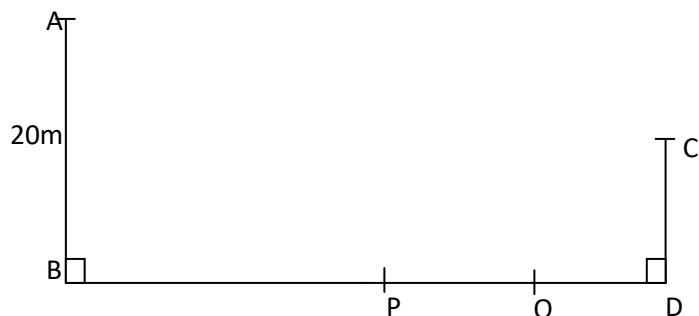
- 16 **2007 Q18 P1**  
In the diagram below PA represents an electricity post of height 9.6m. QB and RC represents two storey buildings of heights 15.4 m and 33.4 m respectively. The angle of depression of A from B is  $5.5^\circ$  While the angle of elevation of C from B is  $30.5^\circ$  and  $BC = 35$ m.



- (a) Calculate, to the nearest metre, the distance AB  
( 2 marks)
- (b) By scale drawing find,  
(i) The distance AC in metres ( 5 marks)  
(ii)  $\angle BCA$  and hence determine the angle of depression of A from C ( 3 marks)

17 **2008 Q20 P1**

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 road a BD is 200m.

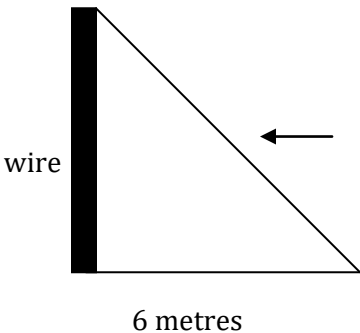


a) A car moves from B towards D. At point P, the angle of depression of the car from point A is  $11.3^\circ$ . Calculate the distance BP to 4 significant figures. (2mks)

b) If the car takes 5 seconds to move from P to Q at an average speed of 36 km/h, calculate the angle of depression of Q from A to 2 decimal places (3mks)

c) Given that  $QC=50.9\text{m}$ , calculate;

- The height of CD in meters to 2 decimal places; (2mks)
- The angle of elevation of A from C to the nearest degree. (3mks)

		Working Space
18	<p><b>2009 Q12 P1</b> An electric pole is supported to stand vertically on a level ground by a tight wire. The wire is pegged at a distance of 6 metres from the foot of the pole as shown.</p>  <p>The angle which the wire makes with the ground is three times the angle it makes with the pole. Calculate the length of the wire to the nearest centimeter.</p>	
19	<p><b>2010 Q13 P1</b> Given that <math>3\theta^\circ</math> is an acute angle and <math>\sin 3\theta^\circ</math>, find the value of <math>\theta</math>.</p> <p style="text-align: right;">(3 marks)</p>	
20	<p><b>2011 Q5 P1</b> Given that <math>\sin (x + 60)^\circ = \cos (2x)</math>, find <math>\tan (x + 60)^\circ</math></p> <p style="text-align: right;">(3marks)</p>	
21	<p><b>2012 Q10 P1</b> Given that <math>\tan x^\circ = \frac{3}{7}</math>, find the <math>\cos (90 - x)^\circ</math> giving the answer to 4 significant figures</p>	