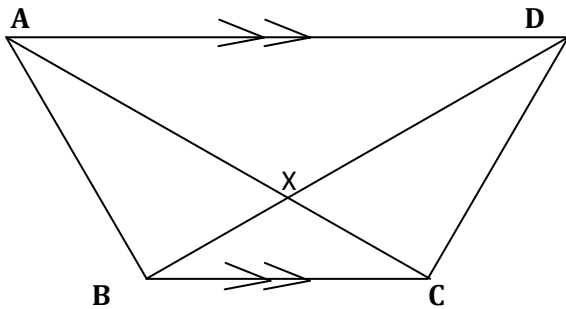


# SIMILARITY AND CONGRUENCY

KCSE 1989 – 2012 Form 2 Mathematics

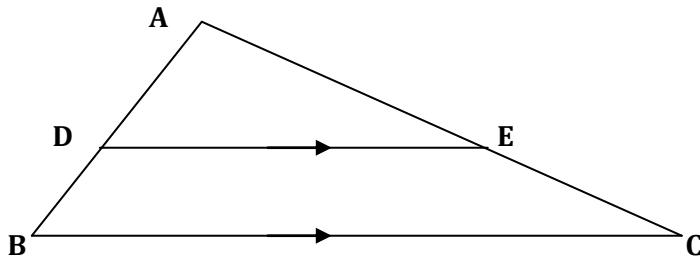
1. **1989 Q15 P2**

In the figure below, **ABCD** IS A cyclic quadrilateral and **BC** is parallel to **AD**. Show that triangle **ABX** is congruent to triangle **DXC**. (4marks)



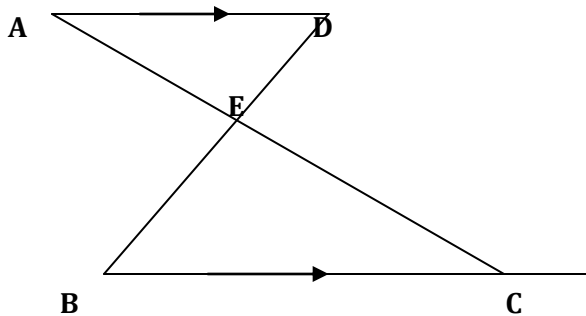
2. **1990 Q7 P2**

In the triangle **ABC** shown below **DE** is parallel to **BC**. If **AE = 3cm** and **EC = 2cm**, determine the ratio of the triangle **ADE** to that of the triangle **ABC**. (2marks)



3. **1991 Q6 P1**

In the figure below **AD // BC**. **AC** and **BD** intersect at **E**. Given that **AE: EC = 1:5** and **BD = 12 cm**, calculate the length of **DE**.

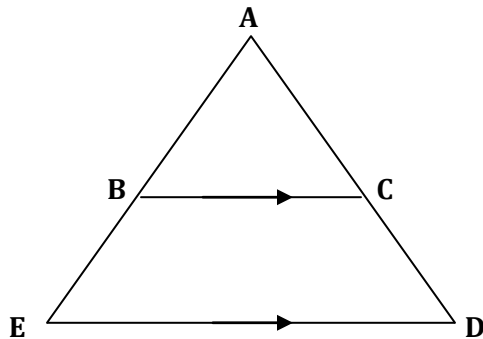


(3marks)

4

**1992 Q5 P1**

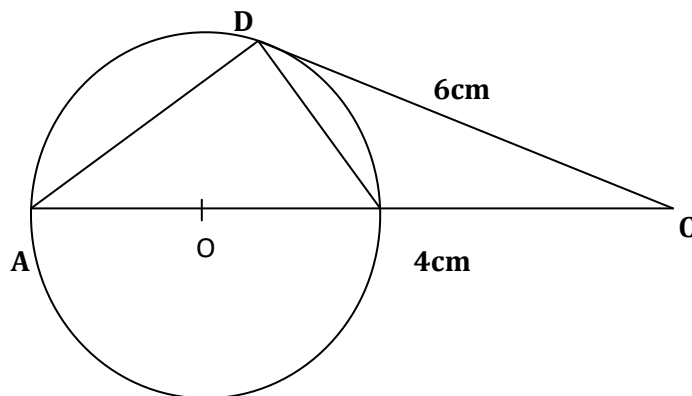
In the figure above, triangle ABC is similar to triangle AED and  $BC \parallel ED$ . Given that the ratio  $AB:AE = 2:5$ , find the ratio of the area of triangle ABC to that of the trapezium BCDE.  
(3marks)



5

**1992 Q21 P1**

In the figure given below (not drawn to scale) DC is a tangent to the circle centre O. AOBC is a straight line.

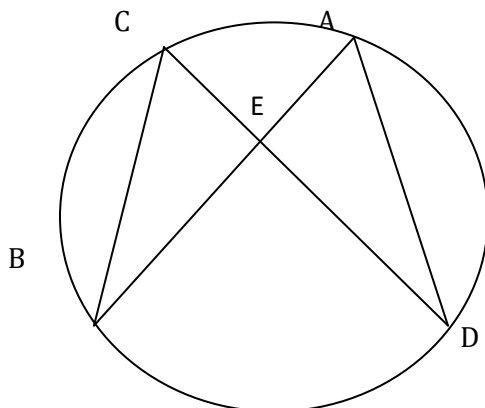


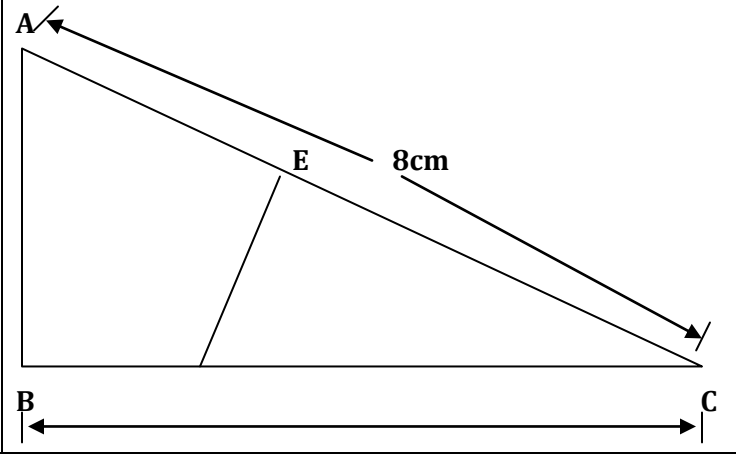
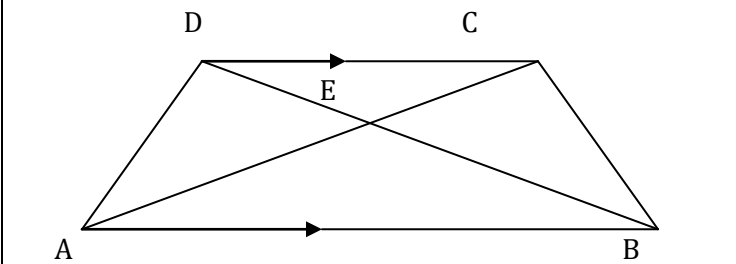
- (a) Show that  $\triangle ADC$  is similar to  $\triangle DBC$ .  
 (b) Given that  $BC = 4\text{cm}$  AND  $DC = 6\text{cm}$ , calculate  
 (i) the length of AB (3marks)  
 (ii) the size of angle ACD (2marks)

6

**1992 Q15 P2**

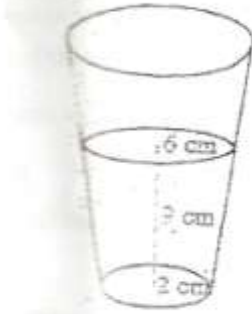
In the figure below, the chord AB and CD intersect at E. Show that  $\triangle AED$  is similar to  $\triangle BEC$ . (3marks)



7	<p><b>1993 Q16 P1</b></p> <p>In the triangle ABC below <math>AC=8\text{cm}</math>, <math>BC=5\text{cm}</math> and angle <math>BCA = 30^\circ</math>. Point D divides BC in the ratio 1:4 and point E divides AC in the ratio 2:3. Find the area of the quadrilateral ABDE (3marks)</p> 
8	<p><b>1993 Q2 P2</b></p> <p>A football tube in the form of a sphere is inflated so that its radius increases in the ratio of 4:3. Find the ratio in which the volume is increased (2marks)</p>
9	<p><b>1994 Q9 P9</b></p> <p>A container of height 30cm has a capacity of 1.5 litres. What is the height of a similar container of capacity 3.0 m<sup>3</sup>? (3marks)</p>
10	<p><b>1995 Q7 P2</b></p> <p>The ratio of the lengths of the corresponding sides of two similar rectangular water tanks is 3:5. The volume of the smaller tank is 8.1 m<sup>3</sup>. Calculate the volume of the larger tank. (3 marks)</p>
11	<p><b>1996 Q10 P2</b></p> <p>Pieces of soap are packed in a cuboid container measuring 36cm by 24cm by 18cm. Each piece of soap is similar to the container. If the linear scale factor between the container and the soap is <math>\frac{1}{6}</math>, find the volume of each piece of soap. (2marks)</p>
12	<p><b>2002 Q15 P2</b></p> <p>In the diagram below, ABCD is a trapezium with AB parallel to DC. The diagonals AC and BD intersect at E.</p>  <p>a) Giving reasons show that triangle ABE is similar to triangle CDE.  b) Giving that <math>AB = 3DC</math>, find the ratio of DB to EB. (2marks)</p>
13	<p><b>2005 Q8 P2</b></p> <p>The volumes of two similar solid cylinders are 4752 cm<sup>3</sup> and 1408 cm<sup>3</sup>. If the area of the curved surface of the smaller cylinder is 352 cm<sup>2</sup>, find the area of the curved surface of the larger cylinder. (4 marks)</p>

**2009 Q21 P1**

- 14 A glass in the form of a frustum of a cone, is represented by the diagram below. The glass contains water to a height of 9 cm. The bottom of the glass is a circle of radius 2 cm while the surface of the water is a circle of radius 6 cm.



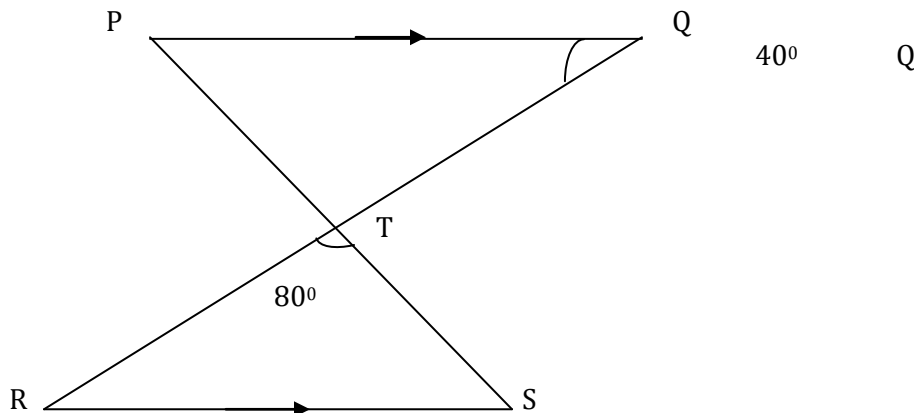
- (a) Calculate the volume of the water in the glass.  
 (b) When a special marble is submerged into the water in the glass, the water level rises by 1 cm.  
 Calculate :  
 (i) the volume of the marble (4 marks)  
 (ii) the radius of the marble (3 marks)

**2011 Q 16 P1**

- 15 A small cone of height 8 cm is cut off from a bigger cone to leave a frustum of height 16cm. If the volume of the smaller cone is  $160\text{cm}^3$ , find the volume of the frustum (3marks)

**2012 Q24 P1**

- 16 In the figure below, PQ is parallel to RS. The lines PS and RQ intersect at T.  $RQ = 10\text{ cm}$ ,  $RT:TQ = 3.2$ , angle  $PQT = 40^\circ$  and angle  $RTS = 80^\circ$ .



- (a) Find the length of RT. (2marks)  
 (b) Determine, correct 2 significant figures:  
 (i) The perpendicular distance between PQ and RS; (2marks)  
 (ii) The length of TS (2marks)  
 (c) Using the cosine rule, find the length of RS correct to 2 significant figures. (2marks)  
 (d) Calculate correct to one decimal place, the area of triangle RTS. (2marks)