AUGUST 2022
EBS 143
GEOMETRY AND TRIGONOMETRY
1 HOUR 30 MINUTES

Candidate's Index Number
Signature:

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
SCHOOL OF EDUCATIONAL DEVELOPMENT AND OUTREACH
INSTITUTE OF EDUCATION

COLLEGES OF EDUCATION
FOUR-YEAR BACHELOR OF EDUCATION (B.ED)
FIRST YEAR, END-OF-SECOND SEMESTER EXAMINATION, AUG/SEPT 2022

AUGUST 22, 2022   GEOMETRY AND TRIGONOMETRY   2:30 PM – 4:00 PM

SECTION B

Answer any TWO questions from this Section.

1.
   a. The diagram below represents a running track with AFD and BEC being semi-circles and ABCD is a rectangle in which $|AB| = |DC| = 70m$, and $|AD| = |BC| = 50m$. Find:

      i. The perimeter of the field

      ii. The total area of the field
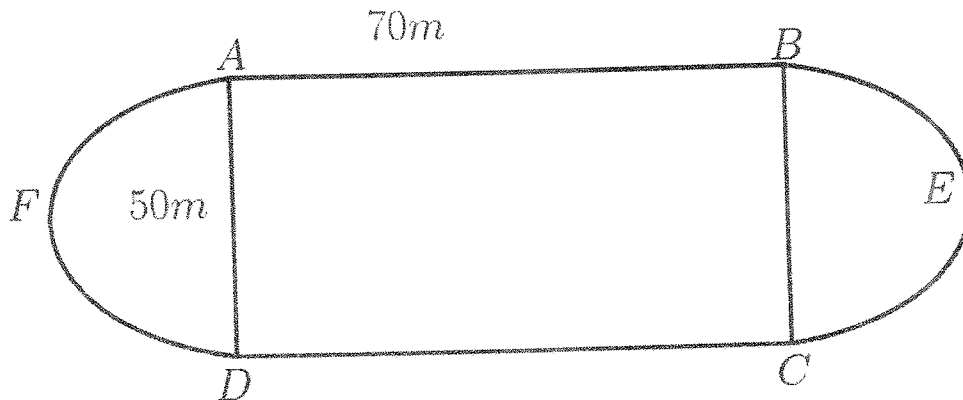
b. The diagram shows a circle with centre O and the points P, Q, R and S. The reflex angle at O is 204^0, angle ORS = 54^0, angle OPS = X^0. Find the measure of the angle X.
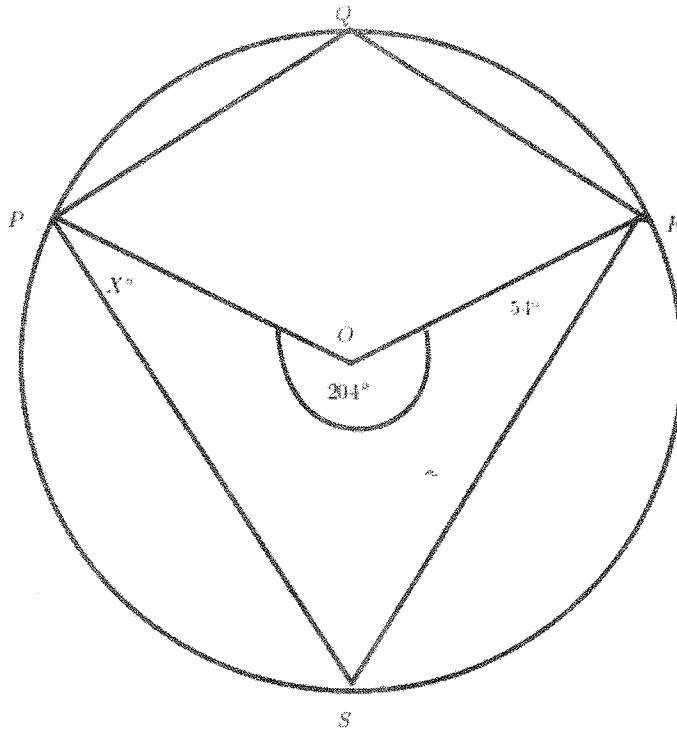
2.
   a. Using ruler and a pair of compasses only, construct
      i. A quadrilateral ABCD where |AB|=8cm, |AD|=6cm, |BC|=10cm, <BAD=60^0 and <ADC=135^0

      ii. The locus L_1 of points equidistant from BC and CD

      iii. The line L_2 from B perpendicular to L_1

      iv. Locate E, the point of intersection of L_1 and L_2

      v. Measure /DE/

   b. Find the equation of the line through the point of intersection of $2x + 3y = 5$ and $3x - y = 2$ and which is parallel to $8y - 2x = 28$

3.
   a. Copy and complete the table of values for $y = 5\sin x + 9\cos x$ for $0^0 \le 180^0$

X	0^0	30^0	60^0	90^0	120^0	150^0	180^0
y		10.3			-0.2		

   i. Using a scale of 2cm to 30^0 on the x – axis and 2cm to 2 units on the y-axis, draw a graph of $y = 5$ sine $x + 9$ cos x for $00 \le x \le 180^0$.

   ii. Use your graph to solve the equation:
       (α). $5 \sin x + 9\cos x = 0$
       (β). $5 \sin x + p \cos x = 2$

   iii. Using the graph, find the value of y when $x=45^0$.

b. The diagram below shows a circle with centre O WITH POINTS A, B, C and D located on its circumference. Given that OBCD is a rhombus, angle BAD = p^0 and angle BCD = q^0. Find:
   i. p
   ii. q

4.
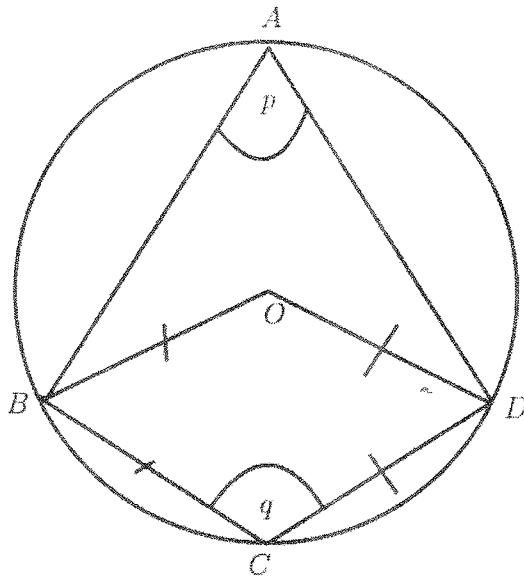
a. Using a scale of 2 cm to 2 units on both axes, draw on a sheet of graph paper two perpendicular axes, Ox and Oy for the interval $-8 \leq x \leq 10$ and $-8 \leq y \leq 10$.

b. Draw on the same graph sheet, indicating clearly the co-ordinates of all vertices.
   i. quadrilateral PQRS with coordinates $P(1,2), Q(5,2), R(5,6)$ and $S(1,6)$.

   ii. the image $P_1Q_1R_1S_1$ of the quadrilateral PQRS under a reflection in the line y —axis where $P \rightarrow P_1, Q \rightarrow Q_1, R \rightarrow R_1$ and $S \rightarrow S_1$.

   iii. the image $P_2Q_2R_2S_2$ of the quadrilateral PQRS under a translation by vector $\begin{pmatrix} 4 \\ -7 \end{pmatrix}$ where $P \rightarrow P_2, Q \rightarrow Q_2, R \rightarrow R_2$ and $S \rightarrow S_2$.

   iv. the image $P_3Q_3R_3S_3$ of quadrilateral PQRS under anti-clockwise rotation through 180^0 about the origin where $P \rightarrow P_3, Q \rightarrow Q_3, R \rightarrow R_3$ and $S \rightarrow S_3$.

c. What type of quadrilateral is PQRS?

d. Determine the length of the diagonal PR of quadrilateral PQRS.