

SEPTEMBER 2023  
EBS 143  
GEOMETRY AND TRIGONOMETRY  
2 HOURS

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, SEPT./OCT. 2023

29<sup>TH</sup> SEPTEMBER 2023

GEOMETRY AND TRIGONOMETRY

12:00 PM – 12:40 PM

This paper consists of two sections, A and B. Answer ALL the questions in Sections A and TWO questions from Section B. Section A will be collected after the first 40 minutes.

SECTION A  
(20 MARKS)

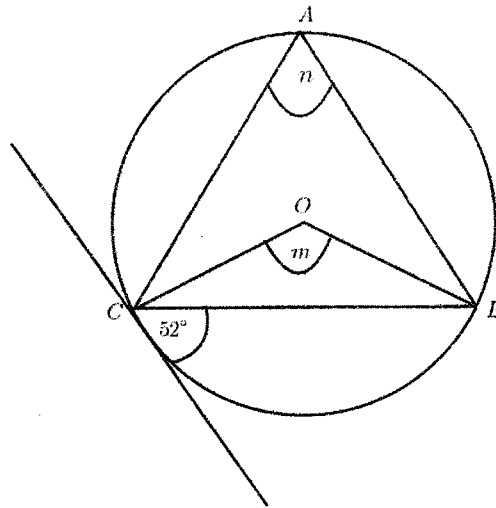
Answer ALL the questions in this Section.

Items 1 to 20 are stems followed by four options lettered A to D. Read each item carefully and circle the letter of the correct or best option.

Take  $\pi = \frac{22}{7}$

1. A triangle has vertices  $A(1,3)$ ,  $B(4,2)$  and  $C(3,8)$ . What unit transformation would produce an image with vertices  $A_1(3, -1)$ ,  $B_1(2, -4)$ , and  $C_1(8, -3)$ ? A .....
    - A. reflection on the x-axis.
    - B. reflection on the y-axis.
    - C. rotation  $90^\circ$  anticlockwise about the origin.
    - D. rotation of  $90^\circ$  clockwise about the origin.
2. A sector of a circle of radius 14 cm subtends an angle of  $54^\circ$  at the centre. Calculate the area of the sector.
    - A.  $29.4\text{cm}^2$
    - B.  $49.2\text{cm}^2$
    - C.  $92.4\text{cm}^2$
    - D.  $94.2\text{cm}^2$

3. The height of an equilateral triangle is  $\sqrt{3}$ cm. What is the perimeter of the triangle?
  - A. 2cm
  - B. 3cm
  - C. 6cm
  - D. 9cm
  
4. The area of a triangle with base length of 12cm is  $156\text{cm}^2$ . Find its height?
  - A. 26cm
  - B. 34cm
  - C. 51cm
  - D. 62cm
  
5.  $O$  is the center of the circle and the angle between the tangent line and the chord  $CB$  is  $52^\circ$ . Calculate the value of  $m + n$ .

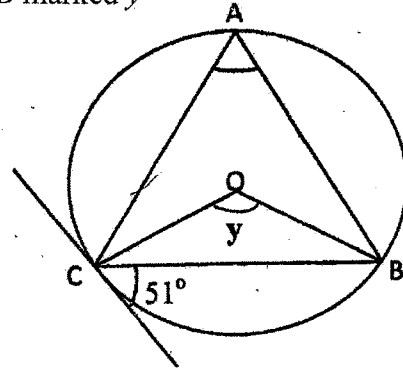


- A.  $6^\circ$
  - B.  $52^\circ$
  - C.  $104^\circ$
  - D.  $156^\circ$
- 
6. Rectangle has how many lines of symmetry?
    - A. 1
    - B. 2
    - C. 3
    - D. 4
  
  7. A solid figure with uniform cross sectional area is called .....
    - A. cone.
    - B. prism.
    - C. pyramid.
    - D. sphere.
  
  8. Find the midpoint of the line  $P(3,4)$  and  $Q(-5,6)$ 
    - A. (1, 5)
    - B. (1, -5)
    - C. (-1, 5)
    - D. (4, 5)

9. Calculate the area of a rhombus of side 13cm given that the length of one of its diagonals is 24cm long.
- A.  $112\text{cm}^2$
  - B.  $120\text{cm}^2$
  - C.  $156\text{cm}^2$
  - D.  $312\text{cm}^2$
10. Given that  $\tan\theta = \frac{4}{3}$ . Find  $\cot\theta$ .
- A.  $\frac{3}{4}$
  - B.  $\frac{4}{3}$
  - C.  $\frac{5}{4}$
  - D.  $\frac{4}{5}$
11. The interior angles of a polygon are  $x^\circ$ ,  $2x^\circ$ ,  $(x + 60)^\circ$ ,  $(x + 10)^\circ$  and  $(x - 10)^\circ$ . Find the value  $x$ .
- A.  $80^\circ$
  - B.  $180^\circ$
  - C.  $360^\circ$
  - D.  $540^\circ$
12. Find the gradient of the straight line whose equation is given by  $5x - 7y = 0$
- A.  $\frac{7}{5}$
  - B.  $\frac{7}{5}$
  - C.  $\frac{5}{7}$
  - D.  $\frac{5}{7}$
13. What will be the resulting image if the point  $(4, -7)$  undergoes three consecutive transformations such as reflection on the line  $y = x$ , reflection on the line  $x = -1$  and the translation by the vector  $\begin{pmatrix} 4 \\ 2 \end{pmatrix}$ ?
- A.  $\begin{pmatrix} 2 \\ 6 \end{pmatrix}$
  - B.  $\begin{pmatrix} -5 \\ 6 \end{pmatrix}$
  - C.  $\begin{pmatrix} -7 \\ 6 \end{pmatrix}$
  - D.  $\begin{pmatrix} 9 \\ 6 \end{pmatrix}$

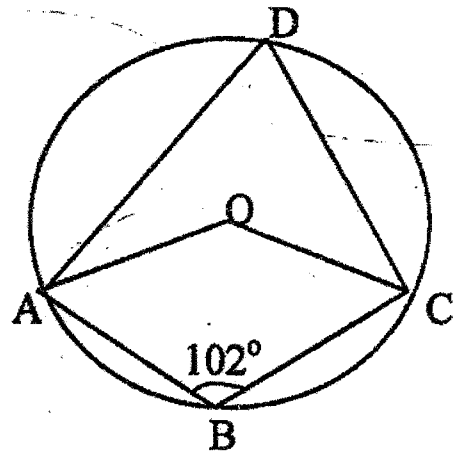
14. In the diagram below,  $O$  is the centre of the circle and the angle between the tangent and the chord  $CB$  is  $51^\circ$ . Calculate the value of  $\angle COB$  marked  $y$

- A.  $78^\circ$
- B.  $102^\circ$
- C.  $104^\circ$
- D.  $141^\circ$



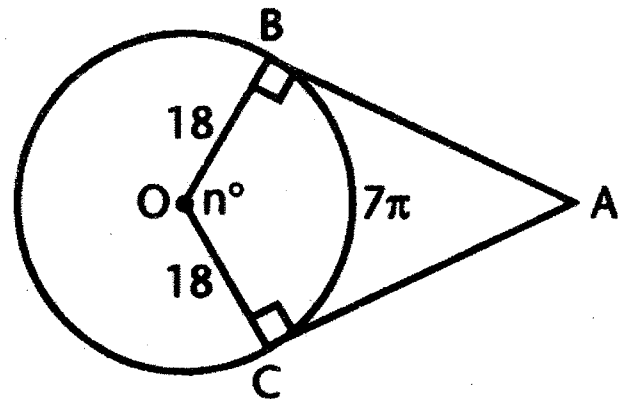
15. The points  $A, B, C$  and  $D$  lie on the circumference of the circle with centre  $O$  as shown in diagram below. If  $\angle ABC = 102^\circ$ , find the value of  $\angle AOC$  subtended by the minor arc  $AC$ .

- A.  $78^\circ$
- B.  $152^\circ$
- C.  $156^\circ$
- D.  $204^\circ$



16. The lines  $|AB|$  and  $|AC|$  are tangents to a circle at points  $B$  and  $C$ , respectively. Minor arc  $BC$  is  $7\pi$  cm. and the radius of the circle is 18 cm. What is the number of degrees in angle  $BAC$ ?

- A.  $70^\circ$
- B.  $90^\circ$
- C.  $95^\circ$
- D.  $110^\circ$



17. A triangle has vertices  $A(1, 3), B(4, 2)$  and  $C(3, 8)$ . What single transformation would produce an image with vertices  $A_2(3, -1), B_2(2, -4)$ , and  $C_2(8, -3)$ ? A .....

- A. reflection on the x-axis.
- B. reflection on the y-axis.
- C. rotation  $90^\circ$  anticlockwise about the origin.
- D. rotation of  $90^\circ$  clockwise about the origin.