

OCTOBER 2023  
EBS 169&169J  
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

4<sup>TH</sup> OCTOBER 2023

TRIGONOMETRY

3:00 PM – 3:40 PM

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

SECTION A  
(20 MARKS)

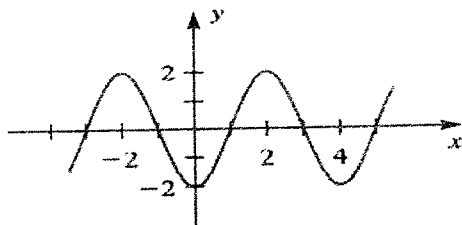
Answer ALL the questions in this Section.

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.

1. What is  $\frac{\pi}{3}$  rad in degrees?
  - A.  $30^\circ$
  - B.  $45^\circ$
  - C.  $60^\circ$
  - D.  $90^\circ$
2. Determine the length of an arc which subtends an angle of 0.8rad at the centre of a circle of radius 10cm.
  - A. 5cm
  - B. 8cm
  - C. 16cm
  - D. 20cm
3. Calculate the area of a sector containing an angle of 1.5rad, in a circle of radius 2cm.
  - A.  $3\text{cm}^2$
  - B.  $6\text{cm}^2$
  - C.  $9\text{cm}^2$
  - D.  $12\text{cm}^2$

4. An arc of a circle, radius 2.5cm, is 3cm long. Determine the angle subtended by the arc at the centre in degrees.
- $30.3^\circ$
  - $42.2^\circ$
  - $56.7^\circ$
  - $68.8^\circ$
5. Find the quadrant containing  $\theta$  if both  $\cos \theta > 0$  and  $\sin \theta < 0$ .
- Quadrant I
  - Quadrant II
  - Quadrant III
  - Quadrant IV
6. If  $\sin \theta = \frac{3}{5}$  and  $\tan \theta < 0$ , determine  $\cos \theta$ .
- $-\frac{3}{4}$
  - $-\frac{4}{5}$
  - $\frac{5}{4}$
  - $\frac{5}{3}$
7. An equilateral triangle of side length of 2 units and angle of  $\theta$  at each intersection point. Determine the exact value of  $\tan \theta$ .
- $\sqrt{3}$
  - $2\sqrt{3}$
  - $1/2$
  - $2/\sqrt{3}$
8. Determine the period of the function  $y = 3 \sin 2x$ .
- $\pi$
  - $2\pi$
  - $3\pi$
  - $4\pi$
9. Calculate the phase shift of  $y = -2 \sin(2x - \pi)$ .
- 2
  - $\frac{\pi}{3}$
  - $\frac{2\pi}{3}$
  - $2\pi$
10. If  $\theta$  is a radian measure of an angle, then  $\tan\left(\frac{\pi}{2} - \theta\right)$  is equal to .....
- $\cos \theta$
  - $\cot \theta$
  - $\sec \theta$
  - $\sin \theta$

11. The graph of an equation is shown below, find the amplitude.



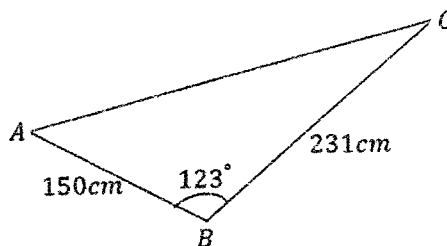
- A. -2
  - B. 2
  - C. 4
  - D. 6
12. If  $\sin x = \frac{3}{5}$  and  $\cos y = \frac{15}{17}$ , where  $x$  is obtuse and  $y$  is acute find the exact value of  $\sin(x + y)$ .

- A.  $\frac{8}{17}$
  - B.  $\frac{32}{85}$
  - C.  $\frac{45}{85}$
  - D.  $\frac{13}{85}$
13. Which of the following is identical to  $\sin 2\theta$ ?
- A.  $2 \sin \theta \cos \theta$
  - B.  $\cos^2 \theta - \sin^2 \theta$
  - C.  $1 - 1 \sin^2 \theta$
  - D.  $2 \cos^2 \theta - 1$

14. Given  $\tan \theta = -\frac{4}{3}$  and  $\theta$  is in quadrant IV, find  $\tan \frac{\theta}{2}$ .

- A.  $-\frac{3}{5}$
- B.  $-\frac{4}{5}$
- C.  $-\frac{1}{2}$
- D. 1

15. Given the diagram below, which 'rule' do you require to solve for the length of the opposite angle B? ..... rule



- A. Cosine
- B. Bothe sine rule and cosine
- C. Pythagoras
- D. Sine

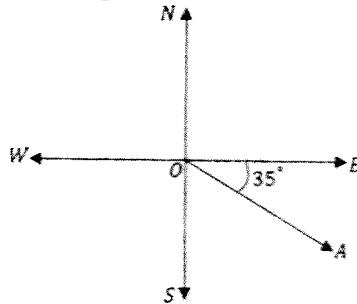
16. The cosine rule can be applied to ..... triangles.

- A. all types of
- B. equilateral
- C. isosceles
- D. only right-angled

17. In triangle  $ABC$ ,  $B = 21^\circ$ ,  $C = 46^\circ$  and  $AB = 9\text{cm}$ , find the side opposite  $B$ .

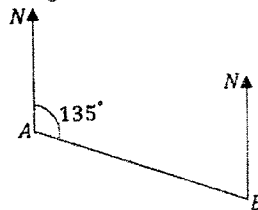
- A.  $4.5\text{cm}$
- B.  $11.5\text{cm}$
- C.  $13.2\text{cm}$
- D.  $15.3\text{cm}$

18. In the diagram below, write the bearing of  $A$  from  $O$ .



- A.  $035^\circ$
- B.  $055^\circ$
- C.  $125^\circ$
- D.  $305^\circ$

19. In the diagram below, write the bearing of  $A$  from  $B$ .



- A.  $45^\circ$
- B.  $045^\circ$
- C.  $135^\circ$
- D.  $315^\circ$

20. The bearing of  $Q$  from  $P$  is  $122^\circ$ , what is the bearing of  $P$  from  $Q$ ?

- A.  $212^\circ$
- B.  $232^\circ$
- C.  $292^\circ$
- D.  $302^\circ$