

AUGUST 2018  
 FDC 122S  
 MATHEMATICS (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

TWO-YEAR DIPLOMA IN BASIC EDUCATION (SANDWICH)  
 FIRST YEAR, END-OF-SECOND SEMESTER FINAL RE-SIT EXAMINATION, AUGUST 2018  
 (PHASE 5)

AUGUST 20, 2018

MATHEMATICS  
 (GEOMETRY AND TRIGONOMETRY)

12:00 PM – 12:40 PM

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

SECTION A  
 (40 MARKS)

Answer ALL the questions in this section

For questions 1 to 10, each stem is followed by four options A to D. Read each question carefully and circle the letters for the correct or best option. Each question carries 2 marks.

1. Given that  $a = \begin{pmatrix} 6 \\ 5 \end{pmatrix}$  and  $b = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$ , evaluate  $a - b$ .

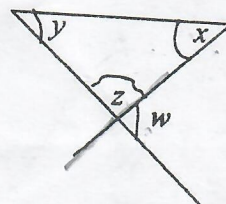
- A.  $\begin{pmatrix} 8 \\ 2 \end{pmatrix}$
- B.  $\begin{pmatrix} 8 \\ 8 \end{pmatrix}$
- C.  $\begin{pmatrix} 4 \\ 2 \end{pmatrix}$
- D.  $\begin{pmatrix} 4 \\ 8 \end{pmatrix}$

$$\begin{aligned}
 & \begin{matrix} a & b \\ \begin{pmatrix} 6 \\ 5 \end{pmatrix} & - \begin{pmatrix} 2 \\ -3 \end{pmatrix} \\ & = \begin{pmatrix} 4 \\ 8 \end{pmatrix} \end{matrix}
 \end{aligned}$$

$$\begin{aligned}
 & a - b \\
 & \begin{pmatrix} 6 \\ 5 \end{pmatrix} - \begin{pmatrix} 2 \\ -3 \end{pmatrix} = \begin{pmatrix} 6-2 \\ 5-(-3) \end{pmatrix} = \begin{pmatrix} 4 \\ 8 \end{pmatrix}
 \end{aligned}$$

2. Which one of the following represents the measure of the angle marked  $w$  in the diagram below?

- A.  $x + z$
- B.  $x + y$
- C.  $z + y$
- D.  $180^\circ - x$

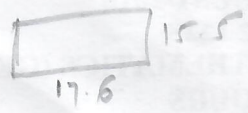


$y + x = w$

3. Calculate the length of wire mesh needed to fence a rectangular garden 17.6m long and 15.5m wide.

- A. 66.2m
- B. 50.7m
- C. 48.6m
- D. 33.1m

$35.2 \times 2$



4. An exterior angle of a regular polygon is  $40^\circ$ . Find the sum of the interior angles of the polygon.

- A.  $140^\circ$
- B.  $1080^\circ$
- C.  $1260^\circ$
- D.  $1620^\circ$

$(9-2) \times 180 = 7 \times 180 = 1260$

$\frac{360}{n} = \frac{360}{40} = 9$

5. If  $\alpha$  is an acute angle such that  $\cos \alpha = \frac{5}{13}$ , find the value of  $\sin \alpha$ .

- A.  $\frac{12}{13}$
- B.  $\frac{8}{13}$
- C.  $\frac{5}{8}$
- D.  $\frac{5}{12}$

6. All of the following triples of angles form interior angles of a triangle except .....

- A.  $88^\circ, 12^\circ, 80^\circ$
- B.  $90^\circ, 18^\circ, 72^\circ$
- C.  $87^\circ, 13^\circ, 90^\circ$
- D.  $78^\circ, 12^\circ, 90^\circ$

7. The point  $M(-2, 1)$  is the midpoint of the line  $LP$ . If the coordinates of  $L$  is  $(-5, 4)$ , find the coordinates of the point  $P$ .

- A.  $P(-2, 1)$
- B.  $P(-1, -2)$
- C.  $P(1, -2)$
- D.  $P(-8, -7)$

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 1}{-5 - (-2)} = 3$

$M = \left( \frac{-5 + x_2}{2}, \frac{4 + y_2}{2} \right)$   
 $\begin{pmatrix} -2 \\ 1 \end{pmatrix} = \begin{pmatrix} -5 + x_2 \\ 4 + y_2 \end{pmatrix}$

$M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$   
 $\begin{pmatrix} -2 \\ 1 \end{pmatrix} = \left( \frac{-5 + x_2}{2}, \frac{4 + y_2}{2} \right)$

$2 \times -2 = -5 + x_2$   
 $-4 = -5 + x_2$   
 $-4 + 5 = x_2$   
 $1 = x_2$

$\frac{4 + y_2}{2} = 1$   
 $4 + y_2 = 2$   
 $y_2 = 2 - 4 = -2$

8. The point  $N(2, 1)$  is the image of  $P(3, -5)$  under a translation in the  $x$ - $y$  plane. Find the translation vector.

- A.  $\begin{pmatrix} 1 \\ 6 \end{pmatrix}$   
 B.  $\begin{pmatrix} 1 \\ -6 \end{pmatrix}$   
 C.  $\begin{pmatrix} -1 \\ -6 \end{pmatrix}$   
 D.  $\begin{pmatrix} -1 \\ 6 \end{pmatrix}$

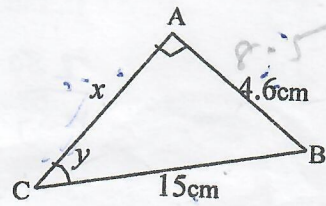
$x - y$

$$\begin{pmatrix} 2 \\ 1 \end{pmatrix} - \begin{pmatrix} 3 \\ -5 \end{pmatrix} = \begin{pmatrix} 2-3 \\ 1-(-5) \end{pmatrix} = \begin{pmatrix} -1 \\ 6 \end{pmatrix}$$

In the right-angled triangle below,  $|AB| = 8.5\text{cm}$  and  $|BC| = 15\text{cm}$ . Use the information to answer questions 9 and 10.

9. Calculate, correct to two decimal places, the value of the length AC, marked  $x$ .

- A. 9.35cm  
 B. 10.36cm  
 C. 12.36cm  
 D. 13.50cm



$$15^2 = 4.6^2 + x^2$$

$$225 - 21.16 = x^2$$

$$203.84 = x^2$$

$$x = 4.882$$

$$4.88$$

10. What is the value of the angle marked  $y$ , correct to one decimal place?

- A.  $60.5^\circ$   
 B.  $55.5^\circ$   
 C.  $35.4^\circ$   
 D.  $34.5^\circ$

O/H

$$\sin y = \frac{4.6}{15}$$

$$15 \sin y = 4.6$$

$$\sin y = 0.31$$

$$y = \sin^{-1}(0.31) = 17.85^\circ = 18^\circ$$

$$H^2 = A^2 + O^2$$

$$H^2 = 4.6^2 + x^2$$

$$225 = 21 + x^2$$

$$204 = x^2$$

$$\frac{14.28285686}{14.3}$$

$$14.3$$

$$H^2 = O^2 + A^2$$

$$15^2 = x^2 + 4.6^2$$

$$225 = x^2 + 21.16$$

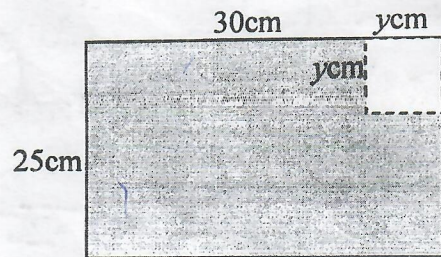
$$225 - 21.16 = x^2$$

$$\sqrt{203.84} = \sqrt{x^2}$$

$$14.3$$

For each of questions 11 to 15, write your solution in the space provided under it. each question carries 4 marks.

11. The diagram below shows a rectangle ABCD from which a square of side  $y$  cm has been cut. If the area of the complete rectangle, ABCD is  $1,000\text{cm}^2$ , find the value of  $y$ .



Area of L x B  
 $1000 = (30+y) \times 25$   
 $1000 = 25(30+y)$   
 $1000 = 750 + 25y$   
 $\frac{250}{25} = \frac{25y}{25}$   
 $y = 10$

$(30+y) \times 25 = 1000$   
 $30y \times 25 = 1000$   
 $(30+y) \times 25 = 1000$   
 $750 + 25y = 1000$   
 $1000 - 750 = 25y$   
 $250 = 25y$   
 $\frac{250}{25} = \frac{25y}{25}$   
 $y = 10$

12. Given that  $u = \begin{pmatrix} 3 \\ -4 \end{pmatrix}$  and  $v = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$ , find  $w$  such that  $w = 2u + 3v$ .

$u = \begin{pmatrix} 3 \\ -4 \end{pmatrix} + \begin{pmatrix} 6 \\ 2 \end{pmatrix}$

$2u + 3v$   
 $\begin{pmatrix} 3 \\ -4 \end{pmatrix} \begin{pmatrix} 6 \\ 2 \end{pmatrix} \Rightarrow \begin{pmatrix} 6 \\ -8 \end{pmatrix} + \begin{pmatrix} 18 \\ 6 \end{pmatrix}$

$\begin{pmatrix} 6 \\ -8 \end{pmatrix} + \begin{pmatrix} 18 \\ 6 \end{pmatrix}$

$\begin{pmatrix} 6 \\ -8 \end{pmatrix} + \begin{pmatrix} 18 \\ 6 \end{pmatrix} = \begin{pmatrix} 24 \\ -2 \end{pmatrix}$

$2u + 3v$

$2 \begin{pmatrix} 3 \\ -4 \end{pmatrix} + 3 \begin{pmatrix} 6 \\ 2 \end{pmatrix}$

$\begin{pmatrix} 2 \times 3 \\ 2 \times -4 \end{pmatrix} + \begin{pmatrix} 3 \times 6 \\ 3 \times 2 \end{pmatrix}$

$\begin{pmatrix} 6 \\ -8 \end{pmatrix} + \begin{pmatrix} 18 \\ 6 \end{pmatrix}$

$\begin{pmatrix} 6+18 \\ -8+6 \end{pmatrix} = \begin{pmatrix} 24 \\ -2 \end{pmatrix}$

Martina Form

precipitazioni

Anno scolastico

1950

36

olympic

OCTOBER 2020  
EBS 143  
GEOMETRY AND TRIGONOMETRY  
1 HOUR 30 MINUTES

Candidate's Index Number
ABCE/PR1/19/0061
Signature: <i>[Signature]</i>

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, OCTOBER 2020

OCTOBER 19, 2020 GEOMETRY AND TRIGONOMETRY 2:30 PM – 4:00 PM

SECTION B  
(60 MARKS)

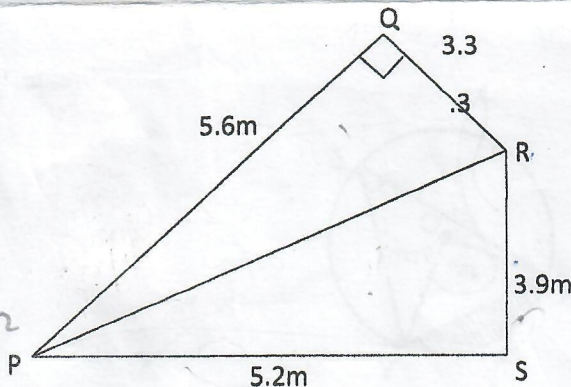
Answer only THREE questions from this section. Show all workings clearly.

1. a) Given that triangle  $ABC$  has the following vertices;  $A(3, 0)$ ,  $B(6, 4)$  and  $C(-1, 3)$ , show that  $ABC$  is a right-angled isosceles triangle. [9 marks]

b) Use the diagram provided to answer the following questions.

- i) Calculate the length of  $|PR|$ , correct to the nearest whole number. [4 marks]

- ii) show that  $\angle PSR = 90^\circ$  [5 marks]



Handwritten work for question 1a:

$$|PS|^2 + |SR|^2 = |PR|^2$$

$$5.2^2 + 3.9^2 = |PR|^2$$

$$27.04 + 15.21 = |PR|^2$$

$$42.25 = |PR|^2$$

$$9^2 + 6^2 = 0^2$$

Handwritten work for question 1bii:

$$|PS|^2 + |SR|^2 = |PR|^2$$

$$(5.2)^2 + (3.9)^2 = |PR|^2$$

$$27.04 + 15.21 = |PR|^2$$

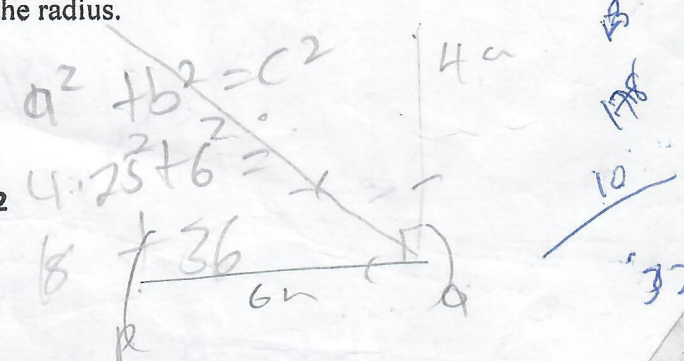
$$42.25 = |PR|^2$$

$$|PR| = 6.5$$

- c) Determine whether or not the point  $(8, 6, 9)$  is a Pythagorean triple? [2 marks]
2. a) A triangle,  $ABC$ , has vertices  $A(-2, -4)$ ,  $B(10, 1)$  and  $C(3, 8)$ . Find the length of its sides and show that the triangle is an isosceles triangle. [7 marks]

b) Using a ruler and a pair of compasses only

- Construct a triangle  $PQR$  with  $|PQ| = 6\text{cm}$ ,  $|QR| = 4\text{cm}$  and  $\angle PQR = 90^\circ$
- Construct perpendicular bisector of  $PQ$  and  $QR$  and name their point of intersection,  $O$ .
- Draw a circle with centre  $O$  and  $|OQ|$  as the radius.
- Measure :
  - $|PR|$  and,
  - $\angle QPR$



Handwritten calculations at the bottom left:

$$\frac{20}{20} + \frac{16}{16} = \frac{36}{36}$$

$$\frac{48}{35} = \frac{83}{83}$$

Handwritten calculations at the bottom right:

$$a^2 + b^2 = c^2$$

$$4^2 + 6^2 = 10^2$$

$$16 + 36 = 52$$

$$10^2 = 100$$

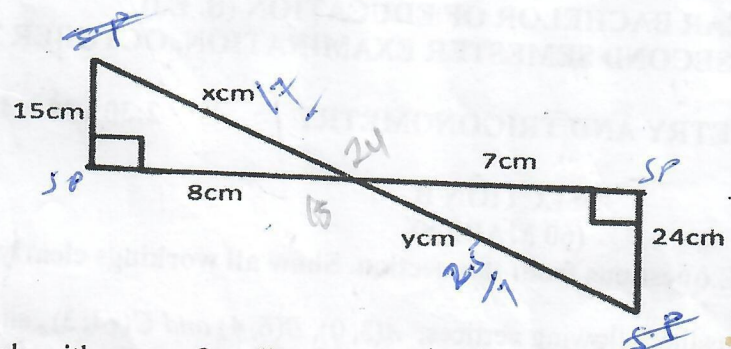
$$(AB)^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$$

3. a) Two people were walking in opposite directions as shown in the figure below. The first person walked 8 cm forward and then took right and walked 15cm. The second person walked 7 cm forward and then and then took right and walked 24cm. Determine how far:

i) the first person was from his initial position ? [5 marks]

ii) the second person was from his starting point? [5 marks]

iii) apart are the two people? [2 marks]

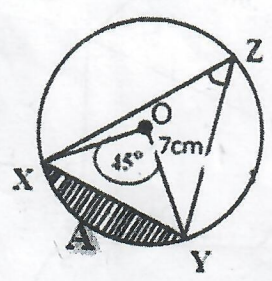


b) XYZ is a circle with centre O, radius 7cm and  $|XY| = 5.3576cm$ .

i) Determine the value of  $\angle XZY$  [3 marks]

ii) What is the value of the length of the arc XAY? [5 marks]

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



4. a) Determine whether or not the lines AB and CD are parallel, given that  $A(1, 2)$ ,  $B(4, 6)$ ,  $C(4, 5)$  and  $D(7, 9)$ . [8 marks]

b) The interior angle of a regular polygon exceeds its exterior angle by  $108^\circ$ . How many sides does the polygon have? [12 marks]

Handwritten calculations for question 4b:

$$\frac{360}{n} \times 108$$

$$\frac{(n-2)180}{n} = \frac{360 \times 108}{n}$$

$$\frac{180n - 360}{n} = \frac{38880}{n}$$

$$180n - 360 = 38880$$

$$180n = 39240$$

$$n = \frac{39240}{180} = 218$$

Other handwritten notes include '10m', '16', '32', '10', '35', and '10'.

JULY, 2021  
EBS 143  
GEOMETRY AND TRIGONOMETRY  
1 HOUR, 30 MINUTES

Candidate's Index Number:

ABCE/ATS/20/0744

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, JULY/AUGUST, 2021

JULY 26, 2021

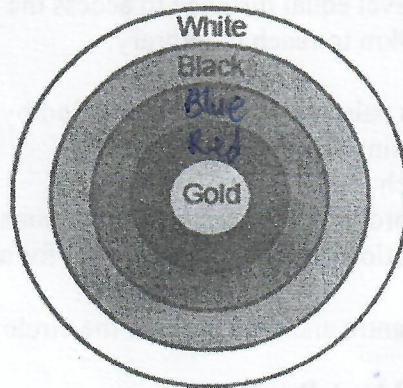
GEOMETRY AND TRIGONOMETRY

2:30 PM – 4:00 PM

SECTION B

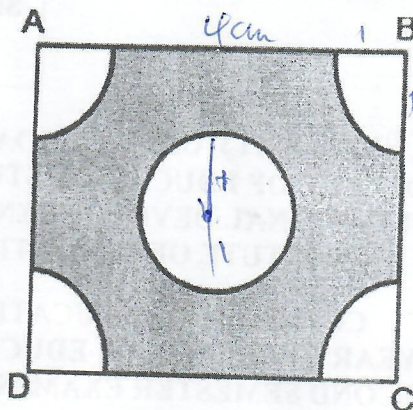
Answer any TWO questions from this section

1. a. The figure depicts an archery target marked with its five scoring regions from the centre outwards as Gold, Red, Blue, Black and White. The diameter of the region representing gold score is 21 cm and each of the other bands is 10.5 cm wide. Find the area of each of the five scoring regions.



- b. Find the perpendicular distance of the point  $(-1,1)$  from the line  $12(x+6)=5(y-2)$ .

2. a. From each corner of a square of side 4 cm a quadrant of a circle of radius 1 cm is cut and also a circle of diameter 2 cm is cut as shown in figure. Find the area of the remaining portion of the square.



- b. An arc  $PQ$  subtends an angle of  $120^\circ$  at the centre of a circle of diameter 14 cm. Calculate

- i. the length of the major arc
- ii. the area of the major sector
- iii. the perimeter of the major sector [ Take  $\pi = 3.142$  ]

3. a. Town A is 20km from town B and 22km from town C while B is 18km from C. A library is to be built to help the reading habits of the three towns. It is to be located such that the students from town B and A will always travel equal distance to access the library facility while students from town C will travel exactly 10km to reach the library.

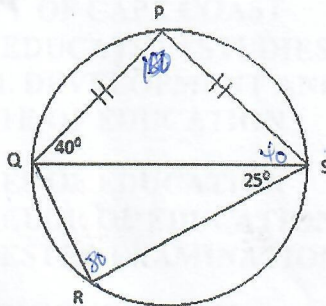
- i. Using ruler and a pair of compasses only, find by construction, the possible locations for the library; Using a scale of 1cm to 2km.
- ii. How many of such locations are there?
- iii. Measure and record the distances of the locations from town B.
- iv. Which of the locations would be convenient for all three towns and why?

- b. Find the coordinates of the centre and the radius of the circle with equation

$$9x^2 + 9y^2 + 6x - 24y + 8 = 0.$$



4. a. In the diagram: P, Q, R and S are points on a circle.  $|PQ| = |PS|$ ,  $\angle PQS = 40^\circ$  and  $\angle QRS = 25^\circ$ . Calculate
- $\angle QPS$
  - $\angle QRS$
  - $\angle RQS$



- b. A 5m long ladder leans against a vertical wall at an angle of  $70^\circ$  to the ground. Accidentally, the ladder slips down the vertical wall by 2m. Find
- the new angle the ladder makes with the ground
  - the distance to the ground the ladder slipped from its initial position (Correct to 2 significant figures).