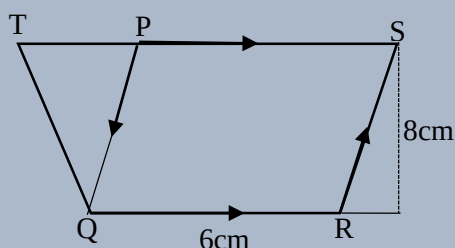


NABPTX CORE MATHEMATICS

TRIAL QUESTIONS

OBJECTIVE

- If $3\log a + 5\log a - 6\log a = \log 64$, what is the value of a ?
A. 4
B. 6
C. 8
D. 16
- In the diagram, TPS is a straight line, $PQRS$ is a parallelogram with base QR and height 8cm . $QR = 6\text{cm}$ and the area of triangle QST is 52cm^2 . Find the area of ΔQPT .

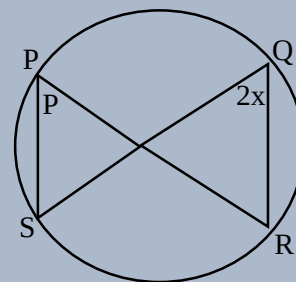


- 39cm
 - 28cm
 - 24cm
 - 21cm
- Evaluate using logarithm tables

$$\begin{array}{r} 5.34 \times 67.4 \\ \hline 2.7 \end{array}$$
 - 1.332
 - 13.32
 - 133.2
 - 1332
 - P and Q are two places on the same circle of latitude 79°S . P is on longitude 68°E while Q is on longitude 22°W . The angular distance between P and Q is...
 - 12°
 - 45°
 - 48°
 - 90°
 - The angle of elevation of X from Y is 30° . If $XY = 40\text{m}$, how high is X above the level of Y ?

- 10m
 - 20m
 - 30m
 - 40m
- Instead of recording the number 1.23cm as the radius of a circle, a student recorded 1.32cm . Find the percentage error correct to one decimal place.
 - 6.8%
 - 7.3%
 - 9.6%
 - 14.4%

- In the diagram below $\angle SPR = p$ and $\angle SQR = 2x$. Find x in terms of p
 - $x = p + 2$
 - $x = p - 2$
 - $x = p^2$
 - $x = \frac{p}{2}$



- If 5 times a certain integer is subtracted from twice the square of the integer, the result is 63. Find the integer.
 - 21
 - 9
 - 7
 - 4
- If $3^y = 243$, find the value of y
 - 2
 - 3
 - 4
 - 5
- Points X and Y are respectively 20km North and 9km East of a point O . What is the bearing of Y from X ? Correct to the nearest degree.
 - 024°

- B. 114°
 C. 156°
 D. 204°

11. If $A=\{a,b,c\}$, $B=\{a,b,c,d,e\}$ and $C=\{a,b,c,d,e,f\}$. Find $\{A \cup B\} \cap \{A \cup C\}$.

- A. $\{a,b,c\}$
 B. $\{a,b,c,d\}$
 C. $\{a,b,c,d,e\}$
 D. $\{a,b,c,d,e,f\}$

Use the following for questions 12 and 13. For a class of 30 students, the scores in a Mathematics test out of 10 marks were as follows

4	5	7	2	3	6	5	5	8	9
5	4	2	3	7	9	8	7	7	7
3	4	5	5	2	3	6	7	7	2

12. What is the mode of the scores?

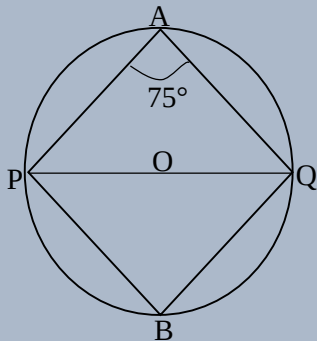
- A. 4
 B. 5
 C. 6
 D. 7

13. What is the median score?

- A. 4
 B. 5
 C. 6
 D. 7

14. In the diagram below, O is the center of the circle. If $\angle PAQ = 75^\circ$. What is the value of $\angle PBQ$?

- A. 15°
 B. 75°
 C. 105°
 D. 150°



15. Find the volume of a cone of radius 3.5cm. and vertical height 12cm.

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

- A. 4.4cm
 B. 154cm
 C. 231cm
 D. 462cm

16. The table below gives the scores of a group of students in an English language test.

Score	2	3	4	5	6	7
No. of students	2	4	7	2	3	2

If a student is chosen at random from the group, what is the probability that he scored at least 6, marks?

- A. $\frac{3}{20}$
 B. $\frac{1}{5}$
 C. $\frac{1}{4}$
 D. $\frac{3}{10}$

17. Solve for $\{x: x^2+2x+1=25\}$

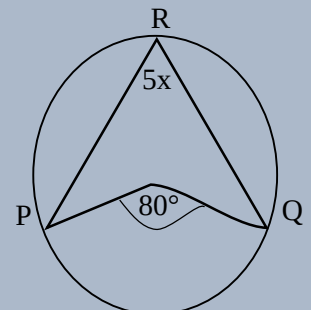
- A. $\{-6, -4\}$
 B. $\{-6, 4\}$
 C. $\{6, -4\}$
 D. $\{6, 4\}$

18. If $\sin\theta = \frac{-\sqrt{3}}{2}$ and $\cos\theta = \frac{-\sqrt{3}}{2}$, what is the value of θ ?

- A. 30°
 B. 60°
 C. 120°
 D. 150°

19. In the diagram, O is the centre of the circle. If $\angle POQ = 80^\circ$ and $\angle PRQ = 5x$, find the value of x.

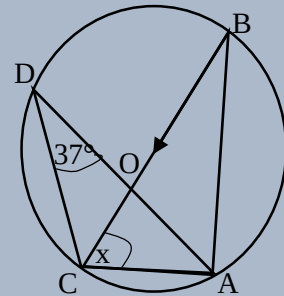
- A. 8°
 B. 16°
 C. 20°
 D. 32°



20. In an arithmetic progression, the first term is 2, and the sum of the 1st and 6th terms is 16.5. What is the 4th term?
- A. 12
B. 9.2
C. 8
D. 5.5
21. The angle of a sector of a circle of diameter 8cm is 135°. Find the area of the sector. (Take $\pi = \frac{22}{7}$)
- A. $9\frac{3}{7}cm^2$
B. $12\frac{4}{7}cm^2$
C. $18\frac{6}{7}cm^2$
D. $25\frac{1}{7}cm^2$
22. Simplify $36\frac{1}{2} \times 64\frac{-1}{3} \times 5^\circ$
- A. 0
B. $\frac{1}{24}$
C. $\frac{2}{3}$
D. $1\frac{1}{2}$
23. The number 186047-was corrected to 186,000. Which of the following can correctly describe the degree of approximation mode?
- I. To the nearest hundred
II. To the nearest thousand
III. To 3 significant figures
IV. To 4 significant figures
- A. All of them
B. I & IV only
C. II & III only
D. II & IV only
24. A student is told to draw the graph of $y = x^2 + 4x - 6$. He is then told to draw a linear graph on the same axis such that the intersection of the two graphs will give the solutions to the equation $x^2 + 4x - 7 = 0$. What is the

equation of the linear graph he needs to draw?

- A. $x = -1$
B. $y = -1$
C. $x = 1$
D. $y = 1$
25. What value of k makes the expression $[m^2 - 8m + k]$ a perfect square?
- A. 64
B. 16
C. 8
D. 4
26. If $\log_{10} q = 2.7078$, what is q?
- A. 5103
B. 510.3
C. 509.3
D. 51.03
27. In the diagram below, O is the centre of the circle. BOC is a diameter and angle ADC is 37°. What is the value of angle ACB?
- A. 53°
B. 47°
C. 39°
D. 37°



28. A rope of length 18m is used to form a sector of a circle of radius 3.5m, on a school playing field. What is the size of the angle the sector formed correct to the nearest degree? (Take $\pi = \frac{22}{7}$)
- A. 180°
B. 90°
C. 40°
D. 33°

29. If $Q = \{\text{all perfect squares less than } 30\}$ and $P = \{\text{all odd numbers from } 1 \text{ to } 10\}$. Find $Q \cap P$

- A. $\{1, 4, 9, 16, 25\}$
- B. $\{1, 3, 4, 5, 7, 9, 16, 25\}$
- C. $\{1, 3, 5, 7, 9\}$
- D. $\{1, 9\}$

30. Simplify $125^{\frac{-1}{3}} \times 497^{\frac{-1}{2}} \times 10$.

- A. 350
- B. 35
- C. $\frac{1}{35}$
- D. $\frac{1}{350}$

31. Express 0.00562 in standard form.

- A. 5.62×10^{-3}
- B. 5.62×10^{-2}
- C. 5.62×10^2
- D. 5.62×10^3 .

32. In a class of 80 students, every student had to study Economics or Geography or both Economics and Geography. If 65 students studied Economics and 50 students studied geography, how many studied both subjects?

- A. 15
- B. 30
- C. 35
- D. 45

33. Solve the equation $7y^2 = 3y$

- A. $y=3$ or 7
- B. $y=0$ or 7
- C. $y=0$ or $\frac{3}{7}$
- D. $y=0$ or 9

34. If the shadow of a pole 7m high is its length, what is the angle of elevation of the sun? [Correct to the nearest degree]

- A. 90°
- B. 63°
- C. 60°
- D. 26°

35. For what value of y is the express

$$\frac{(y+2)}{y^2-3y-10} \text{ undefined?}$$

- A. $y=2$
- B. $y=3$
- C. $y=5$
- D. $y=10$

36. Find the equation whose roots are

$$\frac{-2}{3} \text{ and } \frac{-1}{4}$$

- A. $12x^2 + 11x + 2 = 0$
- B. $12x^2 - 11x + 2 = 0$
- C. $x^2 - \frac{11}{12}x + 2 = 0$
- D. $12x^2 - 11x - 2 = 0$

37. A headmaster contributes 7% of his income into a fund and his wife contributes 4% of her income. If the husband earns GH¢5,500.00 per annum (p.a) and the wife earns GH¢4,000.00 p.a. Find the sum of their annual contribution to the fund.

- A. GH¢605.00
- B. GH¢545.00
- C. GHe490.00
- D. GHe440.00

38. A car is travelling at an average speed of 80km/h. Its speed in meters per second (m/s) is.....

- A. 22.2m/s
- B. 133.3m/s
- C. 222.2m/s
- D. 1333.3m/s

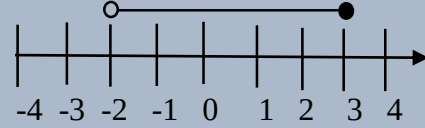
39. The common ratio of geometric progression is 2. If the 5th term is greater than the 1st term by 45. Find the 5th term.

- A. 3
- B. 45
- C. 48
- D. 90

40. Given that $\sin \theta = -0.9063$, where $0 \leq \theta \leq 270^\circ$. Find θ

- A. 65°
- B. 115°

- C. 145°
D. 245°
41. Which of the following is not a measure of dispersion?
A. Mode
B. Mean deviation
C. Range
D. Interquartile range
42. A box contains 2 white and 3 blue identical marbles. If two marbles are picked at random, one after the other without replacement, what is the probability of picking two marbles of different colours.
A. $\frac{3}{5}$
B. $\frac{2}{5}$
C. $\frac{7}{20}$
D. $\frac{3}{10}$
43. The angles of a regular pentagon are x° , $2x^\circ$, $(x+60)^\circ$, $(x+10)^\circ$ and $(x-10)^\circ$. Find the value of x .
A. 40
B. 60
C. 75
D. 80
44. Simplify $\log_3 6 + \log_3 15 - \log_3 5$
A. $\log_3 18$
B. $\log 3$
C. 3
D. 1
45. P varies inversely as the square of W . When $W=4$, $P=9$. Find the value of P when $W=9$
A. $\frac{729}{16}$
B. 6
C. 4
D. $\frac{16}{9}$
46. If x varies over the set of real numbers, which of the following is illustrated in the diagram above?



- A. $-2 \leq x \leq 3$
B. $-2 < x \leq 3$
C. $-2 < x < 3$
D. $-2 \leq x < 3$
47. The cross section of a prism is a right-angled triangle with sides 3cm by 4cm by 5cm. The height of the prism is 8cm. Calculate its volume
A. 48cm^3
B. 60cm^3
C. 96cm^3
D. 120cm^3
48. What is the probability of having an odd number in a single throw of a fair die with the faces numbered 1,2,3,4,5, and 6?
A. $\frac{5}{6}$
B. $\frac{2}{3}$
C. $\frac{1}{2}$
D. $\frac{1}{3}$
49. The table below shows the scores of a group of students in a test. If the average score is 3.5 find the value of x .
A. 1
B. 2
C. 3
D. 4
50. Simplify $\frac{\log \sqrt{8}}{\log 8}$
A. $\frac{1}{3}$
B. $\frac{1}{2}$
C. $\frac{1}{3} \log \sqrt{2}$
D. $\frac{1}{3} \log \sqrt{8}$

END OF OBJECTIVE SECTION

MATHEMATICS PAPER 2

SECTION A

Answer **all** questions from this section.

All questions carry equal marks

1. (a) (i) Simplify $\frac{16x^2 9y^2}{(4x-3y)^2}$; $4x \neq 3y$
(i) if $x=2$, and $y=1$, solve for (i) in (a) above
(b) Factorize completely; $Spq-7rs+5ps-7rq$
2. The admission fee to a Variety Show was GH¢100.00 for adults and GH¢50.00 for children. If 800 people attended the Show and the amount realized was GH¢70,000.00, find the number of adults and the number of children who attended the Show.
3. In a game of ludo, where two dice are thrown; the scores are obtained by finding the product of the numbers appearing on the two dice.
 - (a) Draw a sample space indicating all sample points.
 - (b) What is the probability of obtaining a score greater than 20?
 - (c) Find the probability of obtaining a sum of two- digit product less than 8.
4. A 60 centimetre rule is placed firmly against the longest side of a set-square such that the rule extends both ways. If the angles of the set-square are 30° , 60° and 90° respectively, find with the aid of sketches,
 - (a) The exterior angle the rule makes with the shortest side of the set-square.
 - (b) If the length of the shortest side of the set-square is 12cm, find the length of the other adjacent side4.leaving your answer to two decimal places.
5. (a) The operation is defined on the set R of real numbers by $x*y=\frac{2x+y}{2}$, where $x, y \in R$, If $9*y = 8\frac{1}{3}$, find, the value of y .
(b) Find the truth set of the linear inequality $[\frac{3x+1}{4} - \frac{3+4x}{3} \leq 1]$. Represent your answer on the number line.

SECTION B

PART I

Answer two questions only from this section

All questions carry equal marks.

6. (a) A sector subtends an angle of 80° at the centre of a circle of radius 14cm. Find the
- Length of the arc of this sector
 - Area of the sector
 - Perimeter of the minor sector cut out. (Take $\pi = \frac{22}{7}$)
- (b) The tens digit of a two-digit number is four less than the unit digit. If the product of the tens and unit digit is 21, find the number.
7. In order to avoid falling, a carpenter on top of a high rise building swung with a rope to land on another building. If the path traced by the carpenter gives a relation $f: x \rightarrow x^2 + x - 6$, using an interval of $-5 \leq x \leq 4$, and a scale of 2cm to 1 unit on the x-axis and 2cm to 2units on the y-axis,
- Draw the graph of the path taken by the carpenter
 - Use your graph to find;
 - the equation of the symmetrical line
 - the truth set of $x^2+x=9$
 - the least point reached by the carpenter in his swing.
8. The cost (C) of maintaining a school is partly constant and partly varies as the number of students. With 50 students, the cost is GH¢15,705.00 and with 40 students the cost is GH¢13,305.00.
- Find the cost when there are 45 students.
 - If $1 - \log(x + 1) = \log(x - 8)$, find the possible values of x.
9. Using a ruler and a pair of compasses only.
- Construct a triangle ABC. such that $|\overline{AB}| = 5cm$, $|\overline{AC}| = 7.5cm$ and angle $BAC = 120^\circ$
 - Construct the locus Q_1 of points equidistant from A and B.
 - Construct the locus Q_2 of points equidistant from $|\overline{AB}|$ and $|\overline{AC}|$, which passes through triangle ABC.
 - Label the point of intersection of Q_1 and Q_2 , as P.
 - Circumscribe the triangle ABC
 - Measure $|CP|$ and record it.
 - Measure and record the radius of the circumscribed circle.

PART II

STATISTICS AND PROBABILITY

Answer **one** question only from this section

All questions carry equal marks.

10. The frequency distribution of the marks attained by students in an English Examination at Bravo Vocational Technical Institute (BVTI) is shown below.

Marks%	0-9	10-19	20-29	30-39	40-49	40-49	60-69	70-19	80-89	90-99
Frequency	1	4	8	14	17	13	10	7	4	2

- (a) Construct a cumulative frequency table for the data 14 17 13 10 7 4 2
- Draw the ogive of this data
 - Use your ogive to determine the 40th percentile
- (b) If 20% of the students had distinction, find the probability of choosing at random a student who did not get distinction.
11. A box Contains twenty-five identical balls, ten of them are Black, seven are Red and the rest are White. If Two balls are chosen at random from the box, one after the other without replacement, find the probability that,
- the first ball is red
 - both balls are white or black
 - none of the balls is white

PART III

VECTORS

Answer **one** question only from this section

All questions carry equal marks

12. (a) Dede travels a distance of 24km from town A on a bearing of 060° to town B. She then travels a distance of 18km to a town C, which is 30km east of town A
- Draw a diagram showing the positions of towns A, B and C
 - What is the bearing of town C from town B.
 - Calculate the bearing of town A from town C.
- (b) A plane flies 50km on a bearing 030° and then flies 125km due east. How far east of the starting point is the plane?
13. (a) If the displacement vector from Accra to Kumasi is $(200\text{Km}, 10)$ and the displacement vector from Kumasi to Tamale is $(300\text{km}, 009^\circ)$. Find the single movement from Accra to Tamale to the nearest whole number.
- (b) To get to her office from home, Mrs. Kaye takes a taxi from her home H to a bus stop S which is 5km due east of H. She then walks 1.5km north from S to her office P. Find the displacement $\overrightarrow{HP}$ in compass bearing form, leaving the distance to 1 d.p.

END OF PAPER