MATH TYPE D OBJ

1-10: ADBADDDABD
11-20: DDDBDBACAD
21-30: BEEBCBADAB
31-40: DBCEAEACAB
41-50: CBAEDCAAAA
51-60: DEBCDADACC

11:13 AM

PAPER III

Answer **all** questions.

Each question is followed by five options lettered A to E. Choose the correct option for each question and shade in pencil on your answer sheet the answer space that bears the same letter as the option you have chosen. Give only **one** answer to each question and erase completely any answer you wish to change. Do **all** rough work on this question paper.

An example is given below:

The product of three numbers is 3876. Two of the numbers are 17 and 19. What is the third number?

A. 2
B. 3
C. 6
D. 12
E. 57

The correct option is '12' which is lettered **B**. Therefore, answer space **B** would be shaded as shown below:

[A] [B] [C] [D] [E]

1. A fair die is rolled once. What is the probability of obtaining a 3 or 4?

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. $\frac{5}{6}$

D. $\frac{1}{2}$

E. $\frac{3}{5}$

2. What must be added to the expression $x^2 + \frac{8x}{3}$ to make it a perfect square?

A. $\frac{16}{3}$

B. $\frac{8}{3}$

C. $\frac{64}{9}$

D. $\frac{16}{9}$

E. $\frac{4}{3}$

13. If $x \propto \frac{1}{y}$ and $x = 2$ when $y = 3$, find the value of x when $y = 4$.

A. $\frac{8}{3}$

B. 1

C. 6

D. $\frac{3}{2}$

E. $\frac{1}{2}$

14. Calculate the volume of a sphere whose diameter is 6.5 cm, correct to one decimal place.

A. 143.9 cm^3
B. 143.8 cm^3
C. 44.3 cm^3
D. 44.6 cm^3
E. 144.9 cm^3

15. Two fair dice are thrown together once. Find the probability of getting two odd numbers.

A. $\frac{1}{3}$

B. $\frac{3}{4}$

C. $\frac{1}{2}$

D. $\frac{1}{4}$

E. $\frac{2}{3}$

16. Solve for y if $4y^3 = 500$.

A. 35
B. 5
C. 10
D. 15
E. 25

17. The table below shows the scores obtained by 20 students in a Mathematics test.

Scores of students

Scores	8	10	12	15	18	20
No. of Students	3	5	6	3	2	1

Find the median score.

A. 12
B. 8
C. 10
D. 20
E. 15

18. Consider the truth table below:

P	Q	Y
T	T	T
T	F	F
F	T	F
F	F	F

Which of the following represents Y?

A. $\sim (P \wedge Q)$
B. $P \vee Q$
C. $P \wedge Q$
D. $\sim (P \vee Q)$
E. $P \Rightarrow Q$

19. Find the gradient of a line joining the points (2, 5) and (3, 1).

A. 5
B. 6
C. 5
D. 7
E. 6

3. Find the number of sides of a regular polygon whose interior angle is 120.

A. 3
B. 6
C. 8
D. 4
E. 5

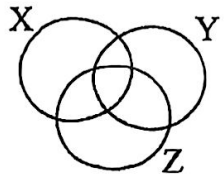
4. Given the following statements:

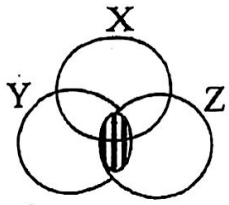
p : You can go away
q : You behave yourself

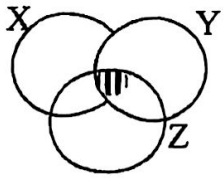
Use a logical connective to describe the statement
"If you go away then you behave yourself".

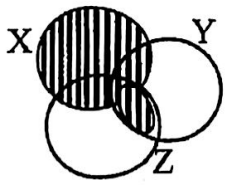
A. $p \Rightarrow q$
B. $q \Rightarrow p$
C. $\sim p \Rightarrow \sim q$
D. $p \wedge q$
E. $q \Rightarrow \sim p$

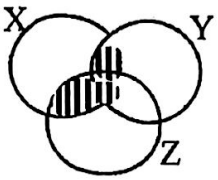
5. Which of the following describes $X \cup (Y \cap Z)$?

A.


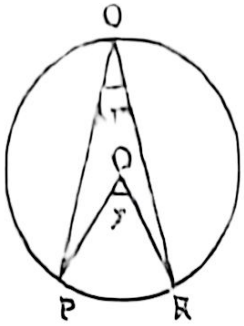
B.


C.


D.


E.


6. Find the value of y in the figure below given that O is the centre of the circle



A. 110°
B. 45°
C. 105°
D. 60°
E. 90°

7. The length and breadth of a rectangular piece of land are $(x + 2)$ m and $(x - 3)$ m respectively. Find the value of x if the perimeter of the land is 30 m.

A. 7 m
B. 5 m
C. 10 m
D. 8 m
E. 3 m

8. Given that $\sin\theta = \frac{8}{17}$ where θ is an acute angle, find the value of $\tan\theta$.

A. $\frac{8}{15}$

B. $\frac{17}{8}$

C. $\frac{17}{15}$

D. $\frac{15}{8}$

E. $\frac{15}{17}$

9. If $L = \frac{3rh}{4\lambda}$, find the values of λ when $r = 0.4$, $L = 0.6$ and $h = 1.5$.

A. 3.125
B. 0.412
C. 1.125
D. 6.201
E. 2.234

10. In a school of 45 teachers, 30 have blue pen and 28 red pen. How many teachers have both colours?

a. 50
b. 103
c. 20
d. 13
e. 10

11. Evaluate $\log 8 \div \log 16$.

A. $\frac{1}{3}$

B. $\frac{1}{2}$

C. $\frac{4}{5}$

D. $\frac{3}{4}$

E. $\frac{2}{3}$

12. Find the sum to infinity of a Geometric Progression whose first term is 10 and common ratio $\frac{2}{3}$.

A. 20
B. 10
C. 15
D. 30
E. 35

20. Convert 1011.11_{two} to base 10.

A. 11

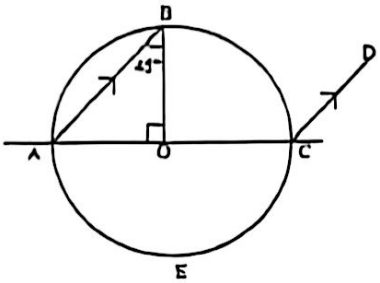
B. 3

C. 47

D. $11\frac{3}{4}$

E. $11\frac{13}{16}$

21. In the figure below, O is the centre of the circle ABCE and AB//CD. If <ABO = 45°, calculate <OCD.



A. 45°
B. 135°
C. 120°
D. 60°
E. 90°

22. Given that $X = \begin{pmatrix} 4 & -11 \\ -8 & 5 \end{pmatrix}$ and $Y = \begin{pmatrix} -5 & 2 \\ 0 & 6 \end{pmatrix}$, evaluate 4X −3Y.

A. $\begin{pmatrix} 31 & -50 \\ -32 & 2 \end{pmatrix}$

B. $\begin{pmatrix} 1 & -38 \\ -32 & 2 \end{pmatrix}$

C. $\begin{pmatrix} 31 & 50 \\ 32 & 38 \end{pmatrix}$

D. $\begin{pmatrix} 1 & 50 \\ -32 & 38 \end{pmatrix}$

E. $\begin{pmatrix} 31 & -38 \\ -32 & 2 \end{pmatrix}$

23. Solve the simultaneous equations:

$2x + y = 4$
$3x - y = 1$

A. $x = -1, y = 2$
B. $x = 1, y = 1$
C. $x = 1, y = -2$
D. $x = -1, y = -2$
E. $x = 1, y = 2$

24. Solve the equation $\log_x 2 + \log_x 8 = 4$.

A. 8
B. 2
C. 4
D. 16
E. 12

25. An aircraft flies from Q (25°N, 38°E) to R (72°S, 38°E). Calculate the distance QR along the line of longitude, correct to the nearest kilometre.
(Take R = 6,400 km, $\pi = \frac{22}{7}$)

A. 29,839
B. 9,810
C. 3,930
D. 10,839
E. 1,039

26. Express the product of 0.016 and 3.54 in standard form.

A. 5.664×10^{3}
B. 5.664×10^{-3}
C. 5.664×10^{-1}
D. 5.664×10^{-3}
E. 5.664×10^{2}

27. If $\log_9 y = 1.5$, find the value of y.

A. 27
B. 63
C. 18
D. 82
E. 45

28. A sector is cut off from a circle of radius 6.4 cm and used to form a cone. If the curved surface area of the cone is 72 cm^2, calculate its radius correct to one decimal place. ($\pi = \frac{22}{7}$)

A. 7.2 cm
B. 6.4 cm
C. 2.5 cm
D. 3.2 cm
E. 3.6 cm

29. The volume of a sphere is 840 cm^3. Find its surface area, correct to the nearest whole number. ($\pi = \frac{22}{7}$)

A. 421 cm^2
B. 250 cm^2
C. 380 cm^2
D. 200 cm^2
E. 430 cm^2

30. Two fair dice are tossed together once. Find the probability that the sum of the outcome is at least 10.

A. $\frac{1}{9}$

B. $\frac{1}{6}$

C. $\frac{1}{5}$

D. $\frac{1}{8}$

E. $\frac{1}{7}$

31. If $\begin{vmatrix} 4 & x \\ 5 & 3 \end{vmatrix} = 42$, find the value of x.

A. 8
B. -4
C. 11
D. 6
E. -6

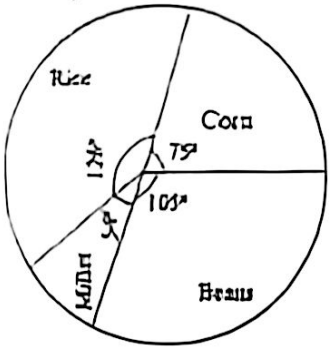
32. Determine the point of intersection of the lines y=5x+6 and y=6x+9.

A. (3, 9)
B. (–3, 9)
C. (–3, –9)
D. (3, –9)
E. (2, 9)

33. Two cities are both on longitude 55°E. If their latitudes are 19°S and 64°S and R = 6,400 km, what is their distance apart in km? Leave your answer in terms of π.

A. 1800π
B. 1200π
C. 1400π
D. 1600π
E. 800π

34. The figure below shows the distribution of crops harvested in a farm. The total bags harvested for all the crops is 300.



What percentage of the crops harvested is beans?

A. 33.4
B. 15.1
C. 25.0
D. 18.0
E. 29.2

35. The radius of a sphere is $5\frac{1}{4}$ cm. Calculate its volume, correct to one decimal place. ($\pi = \frac{22}{7}$)

A. 606.4 cm^3
B. 115.5 cm^3
C. 1212.8 cm^3
D. 303.2 cm^3
E. 2425.5 cm^3

36. Q varies inversely as the square of P and Q = 20 when P = 3. Find the value of P when Q = m.

A. $P = \sqrt{\frac{m}{180}}$

B. $P = 180m$

C. $P = \frac{20m}{9}$

D. $P = \frac{\sqrt{20m}}{3}$

E. $P = \sqrt{\frac{180}{m}}$

37. Evaluate $100^{\frac{-1}{2}} \times 32^{\frac{1}{5}} \times 243^{\frac{2}{5}}$.

A. $\frac{9}{5}$

B. 9

C. $\frac{7}{3}$

D. $\frac{9}{7}$

E. 8

38. Find the number of terms in an Arithmetic Progression whose 1st and last terms are 24 and 69 respectively and the common difference is 3.

A. 14
B. 13
C. 16
D. 12
E. 15

39. Find the sum and the product of the roots of the equation $3x^2 - 2x - 6 = 0$ respectively.

A. $\frac{2}{3}, -2$

B. $-2, \frac{2}{3}$

C. $-2, -\frac{2}{3}$

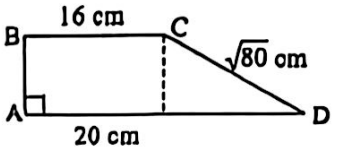
D. $-2, -\frac{1}{3}$

E. $-\frac{1}{3}, -2$

40. The bearing of two points Q and R from a point P are 030° and 120° respectively. If |PQ| = 12 m and |PR| = 5 m, find |QR|.

A. 11 m
B. 13 m
C. 7 m
D. 5 m
E. 9 m

41. If /AD/ = 20 cm, calculate the area of the trapezium ABCD in the figure below.



A. 160 cm^2
B. 104 cm^2
C. 144 cm^2
D. 154 cm^2
E. 164 cm^2

42. A plank of length 75.64 cm was measured by a carpenter with a percentage error of 0.74. Calculate the error correct to 2 decimal places.

A. 0.54 cm
B. 0.56 cm
C. 0.74 cm
D. 0.55 cm
E. 0.57 cm

43. If $x = -2$, $y = 6$ and $z = 3$, evaluate $\frac{x^2(y+z)}{2y-2z}$.

A. 6
B. 7
C. 11
D. 9
E. 3

44. A man deposited a sum of ₦45,000.00 in a bank at 3% simple interest. Calculate the amount at the end of 7 years.

A. ₦44,450.00
B. ₦63,900.00
C. ₦35,550.00
D. ₦64,450.00
E. ₦54,450.00

45. Find the rate percent per annum is ₦36,000.00 is paid as simple interest on ₦240,000.00 in 3 years.

A. 18
B. 10
C. 6
D. 5
E. 3

46. If 15 is the mean of the following set of numbers: 4, 6, x, 10, 5, find the value of x.

A. 65
B. 75
C. 50
D. 55
E. 42

47. Find the value of k^2 if $2x^2 - kx + 3 = 0$ has equal roots.

A. 24
B. 14
C. 6
D. 25
E. 29

48. Find the area bounded by the curve $y = x^2 + \frac{1}{x^2}$, x-axis and the ordinates $x = 2$ and $x = 3$.

A. $6\frac{1}{2}$ square units

B. $9\frac{1}{3}$ square units

C. $2\frac{5}{6}$ square units

D. $12\frac{1}{6}$ square units

E. $15\frac{5}{6}$ square units

49. Consider the following statements:

p : Ade lives in Abuja
q : Ade lives in Nigeria

Write in symbolic form the statement "If Ade lives in Abuja then he lives in Nigeria".

A. $p \Rightarrow q$
B. $\sim q \Rightarrow p$
C. $\sim p \Rightarrow q$
D. $p \vee q$
E. $p \wedge q$

50. Given that $P = \begin{pmatrix} -2 & 1 \\ 3 & 4 \end{pmatrix}$ and $Q = \begin{pmatrix} 5 & -3 \\ 2 & -1 \end{pmatrix}$, find the value of $2P + Q$.

A. $\begin{pmatrix} 1 & -1 \\ 8 & 7 \end{pmatrix}$

B. $\begin{pmatrix} -1 & 1 \\ 7 & 4 \end{pmatrix}$

C. $\begin{pmatrix} -4 & 2 \\ 6 & 8 \end{pmatrix}$

D. $\begin{pmatrix} 8 & 6 \\ 2 & -4 \end{pmatrix}$

E. $\begin{pmatrix} 4 & 7 \\ -1 & 1 \end{pmatrix}$

51. A chord of a circle subtends an angle 120° at the centre with radius 6 cm. Find the area of the minor segment, correct to three significant figures. $\left(Take\ \pi = \frac{22}{7}\right)$.

A. 53.3 cm^2
B. 113.0 cm^2
C. 15.6 cm^2
D. 22.1 cm^2
E. 37.7 cm^2

52. Calculate the variance of the following data: 6, 4, 5, 9.

A. 2.4
B. 1.8
C. 6.0
D. 3.4
E. 3.5

53. If P varies directly as the square root of Q and P = 3 when Q = 16, find the value of Q when P = 6.

A. 36
B. 64
C. 6
D. 24
E. 8

54. If $\begin{vmatrix} 2 & 3 & -1 \\ 5 & x & 3 \\ -3 & 5 & 2 \end{vmatrix} = -106$, find the value of x.

A. 4
B. 5
C. 6
D. 5
E. 6

55. A right circular cone of base radius 6 cm is 8 cm high. Find the volume of the cone, correct to two significant figures.
(Take = 3.142)

A. 220 cm^3
B. 320 cm^3
C. 210 cm^3
D. 300 cm^3
E. 200 cm^3

56. Find the range of values of x for which $4 + x \leq 7$ and $13 + x \geq 8$ are both satisfied.

A. $-5 \leq x \leq 3$
B. $-5 \leq x \geq 3$
C. $-3 \leq x \leq 5$
D. $-3 \leq x \geq 5$
E. $5 \leq x < 3$

57. Calculate the amount, if a sum of ₦320,000.00 is invested for 4 years at 5% per annum simple interest.

A. ₦584,000.00
B. ₦648,000.00
C. ₦448,000.00
D. ₦384,000.00
E. ₦326,400.00

58. If a number is chosen at random from the set $\{x: 7 \leq x \leq 19\}$, find the probability that it is a multiple of 3 or 4.

A. $\frac{6}{13}$
B. $\frac{5}{13}$
C. $\frac{11}{13}$
D. $\frac{9}{13}$
E. $\frac{7}{13}$

59. A tailor saved ₦18,000.00 in a bank which pays 15% per annum compound interest. Find the amount in 6 years.

A. ₦21,635.00
B. ₦51,634.00
C. ₦41,635.10
D. ₦30,563.00
E. ₦42,563.00

60. Solve the equation $\frac{2m+3}{2m+5} - \frac{m-1}{m-2} = 0$.

A. $-\frac{1}{2}$

B. $\frac{3}{5}$

C. $-\frac{1}{4}$

D. $\frac{1}{2}$

E. $\frac{1}{4}$