

## MATHEMATICS PAST QUESTION

1

Look at this series:  $2, 1, \frac{1}{2}, \frac{1}{4}, \dots$  What number should come next?

- A.  $\frac{1}{3}$
- B.  $\frac{1}{8}$
- C.  $\frac{2}{8}$
- D.  $\frac{1}{16}$
- E.  $\frac{1}{32}$

2

A group of market women sell at least one of yam, plantain and maize. 12 of them sell maize, 10 sell yam and 14 sell plantain. 5 sell plantain and maize, 4 sell yam and maize, 2 sell yam and plantain only while 3 sell all the three items. How many women are in the group?

- A. 25
- B. 19
- C. 18
- D. 17

3

If  $\log 10$  to base 8 = X, evaluate  $\log 5$  to base 8 in terms of X.

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

4

Find the value of X if  $\frac{\sqrt{2}}{X+\sqrt{2}} = \frac{1}{X-\sqrt{2}}$

- A.  $3\sqrt{2}+4$
- B.  $3\sqrt{2}-4$
- C.  $3-2\sqrt{2}$
- D.  $4+2\sqrt{2}$

5

If  $\frac{(a^2b^{-3}c)}{a^{-1}b^4c^5} = a^pb^qc^r$  What is the value of  $p+2q$ ?

- (5/2)
- -(5/4)
- -(25/4)
- -10

6

If  $\{(a^2b^{-3}c)^{3/4}/a^{-1}b^4c^5\} = a^pb^qc^r$ ; what is the value of  $p+2q$ ?

- A. (5/2)
- B. -(5/4)
- C. -(25/4)
- D. -10

7

A trader bought 100 oranges at 5 for N1.20, 20 oranges got spoilt and the remaining were sold at 4 for N1.50. Find the percentage gain or loss.

- A. 30% gain
- B. 25% gain

- C. 30% loss
- D. 25% loss

8

What is the answer when  $2434_6$  is divided by  $42_6$ ?

- A.  $23_6$
- B.  $35_6$
- C.  $52_6$
- D.  $55_6$

9

If  $2_9 \times (3Y)_9 = 3_5 \times (3Y)_5$ , find the value of Y.

- A. 4
- B. 3
- C. 2
- D. 1

10

Simplify  $\sqrt{\frac{(0.0023 \times 750)}{(0.00345 \times 1.25)}}$

- A. 15
- B. 20
- C. 40
- D. 75

11

If  $m \times n = \left(\frac{m}{n} - \frac{n}{m}\right)$  for m, n belong to R, evaluate  $-3^4$

- $-25/12$
- $-7/12$
- $7/12$
- $25/12$

12

The sum of two numbers is twice their difference. If the difference of the numbers is P, find the larger of the two numbers

- A.  $p/2$
- B.  $3p/2$
- C.  $5p/2$
- D.  $3p$

13

A binary operation \* is defined by  $a*b = ab+a+b$  for any real number a and b. if the identity element is zero, find the inverse of 2 under this operation.

- A.  $2/3$
- B.  $1/2$
- C.  $-1/2$
- D.  $-2/3$

14

Factorize completely  $X^2+2XY+Y^2+3X+3Y-18$

- A.  $(x+y+6)(x+y-3)$
- B.  $(x-y-6)(x-y+3)$
- C.  $(x-y+6)(x-y-3)$
- D.  $(x+y-6)(x+y+3)$

15

Tope bought X oranges at N5.00 each and some mangoes at N4.00 each. if she bought twice as many mangoes as oranges and spent at least N65.00 and at most N130.00, find the range of values of X.

- A.  $4 \leq X \leq 5$
- B.  $5 \leq X \leq 8$
- C.  $5 \leq X \leq 10$
- D.  $8 \leq X \leq 10$

16

Three consecutive positive integers  $k$ ,  $l$  and  $m$  are such that  $l^2 = 3(k+m)$ . Find the value of  $m$

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

17

Express  $\frac{1}{x^3-1}$  in partial fractions

- A.  $\frac{1}{3}\{(1/x-1)-(x-2/x^2-x+1)\}$
- B.  $\frac{1}{3}\{(1/x-1)-(x+2/x^2+x+1)\}$
- C.  $\frac{1}{3}\{(1/x-1)-(x-2/x^2+x+1)\}$
- D.  $\frac{1}{3}\{(1/x-1)-(x-2/x^2-x-1)\}$

18

The first term of a geometric progression is twice its common ratio. Find the sum of the first two terms of the G.P if its sum to infinity is 8.

- A.  $8/5$
- B.  $8/3$
- C.  $72/25$
- D.  $56/9$

19

Divide  $4x^3-3x+1$  by  $2x-1$

- A.  $2x^2-x+1$
- B.  $2x^2-x-1$
- C.  $2x^2+x+1$
- D.  $2x^2+x-1$

20

Find a positive value of  $\bar{a}$  if the coordinate of the centre of a circle  $X^2+y^2-2\bar{a}x+4y-\bar{a} = 0$  is  $(\bar{a}, -2)$  and the radius is 4 units.

- A. 1
- B. 2
- C. 3
- D. 4

21

A man 1.7m tall observes a bird on top of a tree at an angle of  $30^\circ$ . if the distance between the man's head and the bird is 25m, what is the height of the tree?

- A. 26.7m
- B. 14.2m
- C.  $1.7+(25\frac{\sqrt{3}}{3})m$
- D.  $1.7+(25\frac{\sqrt{2}}{2})m$

22

In  $\triangle MNO$ ,  $MN = 6$  units,  $MO = 4$  units and  $NO = 12$  units. If the bisector of  $\angle M$  meets  $NO$  at  $P$ , calculate  $NP$ .

- A. 4.8 units
- B. 7.2 units
- C. 8.0 units
- D. 18.0 units

23

Find the tangent to the acute angle between the lines  $2x+y = 3$  and  $3x-2y = 5$ .

- A.  $-7/4$
- B.  $7/8$
- C.  $7/4$
- D.  $7/2$

24

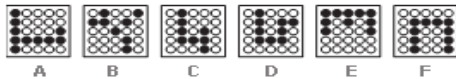
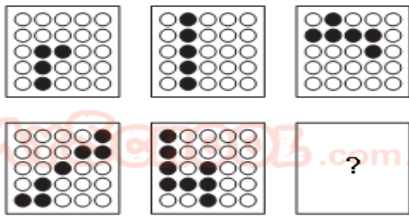
From a point  $P$ , the bearings of two points  $Q$  and  $R$  are  $N67^\circ W$  and  $N23^\circ E$  respectively. If the bearing of  $R$  from  $Q$  is  $N68^\circ E$  and  $PQ = 150m$ , calculate  $PR$

- A. 120m
- B. 140m

- C. 150m
- D. 160m

25

What is missing in the last grid?



What is missing in the last grid in the drawing shown?

- A.
- B.
- C.
- D.
- E.

26

A two-digit number, say AB was mistakenly written as BA by an overworked student. Due to this error, the student was working with a number bigger in value, and its difference with the actual number is one less than the actual number. If the sum of the two digits is half a score. What is the actual number?

- A. 43
- B. 34
- C. 73
- D. 21
- E. 37

27

Find the equation of the locus of a point P(x,y) such that PV = PW, where V = (1,1) and W = (3,5)

- A.  $2x + 2y = 9$
- B.  $2x + 3y = 8$
- C.  $2x + y = 9$
- D.  $x + 2y = 8$

28

Find the area bounded by the curve  $y = x(2-x)$ . The x-axis,  $x = 0$  and  $x = 2$ .

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

29

Evaluate:  $\int_0^z (\sin x - \cos x) dx$  Where letter  $z = \frac{\pi}{4}$ . ( $\pi = \pi i$ )

- A.  $\sqrt{2} + 1$
- B.  $\sqrt{2} - 1$
- C.  $-\sqrt{2} - 1$
- D.  $1 - \sqrt{2}$

30

Find the volume of solid generated when the area enclosed by  $y = 0$ ,  $y = 2x$ , and  $x = 3$  is rotated about the x-axis.

- A.  $81 \pi$  cubic units
- B.  $36 \pi$  cubic units
- C.  $18 \pi$  cubic units

- D.  $9\pi$  cubic units

31

What is the derivative of  $t^2 \sin(3t - 5)$  with respect to  $t$ ?

- A.  $6t \cos(3t - 5)$
- B.  $2t \sin(3t - 5) - 3t^2 \cos(3t - 5)$
- C.  $2t \sin(3t - 5) + 3t^2 \cos(3t - 5)$
- D.  $2t \sin(3t - 5) + t^2 \cos 3t$

32

Evaluate  $\int_{-2}^1 (x - 1)^2 dx$

- A.  $-\frac{10}{3}$
- B. 7
- C. 9
- D. 11

33

Find the value of  $x$  for which the function  $y = x^3 - x$  has a minimum value.

- A.  $-\sqrt{3}$
- B.  $-\sqrt{\frac{3}{3}}$
- C.  $\sqrt{\frac{3}{3}}$
- D.  $\sqrt{3}$

34

If the minimum value of  $y = 1 + hx - 3x^2$  is 13, find  $h$ .

- A. 13
- B. 12
- C. 11
- D. 10

35

Let  $P = \{1, 2, u, v, w, x\}$ ;  $Q = \{2, 3, u, v, w, 5, 6, y\}$  and  $R = \{2, 3, 4, v, x, y\}$ .

Determine  $(P - Q) \cap R$

- A.  $\{1, x\}$
- B.  $\{x, y\}$
- C.  $\{x\}$
- D.  $\phi$

36

If the population of a town was 240,000 in January 1998 and it increased by 2% each year, what would be the population of the town in January, 2000?

- A. 480,000
- B. 249,696
- C. 249,600
- D. 244,800

37

If  $\frac{(2\sqrt{3}-\sqrt{2})}{(\sqrt{3}+2\sqrt{2})} = m + n\sqrt{6}$ , find the values of  $m$  and  $n$  respectively.

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

38

In a youth club with 94 members, 60 like modern music, and 50 like traditional music. The number of members who like both traditional and modern music is three times those who do not like any type of music. How many members like only one type of music?

- A. 8
- B. 24
- C. 62
- D. 86

39

Evaluate  $(2.813 \times 10^{-3} \times 1.063) (5.637 \times 10^{-2})$ 

- A. 0.056
- B. 0.055
- C. 0.054
- D. 0.54

40

A man wishes to keep his money in a savings deposit at 25% compound interest so that after three years he can buy a car for N150,000. How much does he need to deposit?

- A. N112,000.50
- B. N96,000.00
- C. N85,714.28
- D. N76,800.00

41

If  $314_{10} - 256_7 = 340_x$ , find x.

- A. 7
- B. 8
- C. 9
- D. 10

42

Simplify  $3(2^{n+1}) - 4(2^{n-1}) 2^{n+1} - 2^n$ 

- A.  $2^{n+1}$
- B.  $2^{n-1}$
- C. 4
- D.  $1/4$

43

If  $P344_6 - 23P2_6 = 2PP2_6$ , find the value of the digit P.

- A. 2
- B. 3
- C. 4
- D. 5

44

A binary operation  $*$  is defined by  $a*b = a^b$ . If  $a*2 = 2-a$ , find the possible values of a.

- A. 1, -1
- B. 1, 2
- C. 2, -2
- D. 1, -2

45

The 3rd term of an A.P is  $4x - 2y$  and the 9th term is  $10x - 8y$ . Find the common difference.

- A.  $19x - 17y$
- B.  $8x - 4y$
- C.  $x - y$
- D.  $2x$

46

Find the inverse of p under the binary operation  $*$  defined by  $p*q = p + q - pq$ , where p and q are real numbers and zero is the identity

- A. p
- B.  $p - 1$
- C.  $p/(p-1)$
- D.  $p/(p+1)$

47

Evaluate  $(1/2 - 1/4 - 1/8 - 1/16 + \dots) - 1$



- A.  $2/3$
- B. zero
- C.  $-2/3$
- D. -1

48

if  $(x - 1)$ ,  $(x + 1)$  and  $(x - 2)$  are factors of the polynomial  $ax^3 + bx^2 + cx - 1$ , find a, b, c in that order.

- A.  $-1/2, 1, 1/2$
- B.  $1/2, 1, 1/2$
- C.  $1/2, 1, -1/2$
- D.  $1/2, -1, 1/2$

49

A trader realizes  $10x - x^2$  naira profit from the sale of  $x$  bags on corn. How many bags will give him the desired profit?

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

50

Solve the inequality  $2 - x > x^2$ .

- A.  $x < -2$  or  $x > 1$
- B.  $x > 2$  or  $x < -1$
- C.  $-1 < x < 2$
- D.  $-2 < x < 1$

51

If  $\alpha$  and  $\beta$  are the roots of the equation  $3x^2 + 5x - 2 = 0$ , find the value of  $1/\alpha + 1/\beta$

- A.  $-5/3$
- B.  $-2/3$
- C.  $1/2$
- D.  $5/2$

52

A frustrum of pyramid with square base has its upper and lower sections as squares of sizes 2m and 5m respectively and the distance between them 6m. Find the height of the pyramid from which the frustrum was obtained.

- A. 8.0 m
- B. 8.4 m
- C. 9.0 m
- D. 10.0 m

53

P is a point on one side of the straight line UV and P moves in the same direction as UV. If the straight line ST is on the locus of P and angle VUS =  $60^\circ$ , find angle UST.

- A.  $310^\circ$
- B.  $130^\circ$
- C.  $80^\circ$
- D.  $50^\circ$

54

A ship sails a distance of 50km in the direction  $S50^\circ E$  and then sails a distance of 50km in the direction  $N40^\circ E$ . Find the bearing of the ship from the original position.

- A.  $S90^\circ E$
- B.  $N40^\circ E$
- C.  $S95^\circ E$
- D.  $N85^\circ E$

55

An equilateral triangle of side  $\sqrt{3}$ cm is inscribed in a circle. Find the radius of the circle.

- A.  $2/3$  cm
- B. 2 cm
- C. 1 cm
- D. 3 cm

56

$3y = 4x - 1$  and  $Ky = x + 3$  are equations of two straight lines. If the two lines are perpendicular to each other, find K.

- A.  $-4/3$
- B.  $-3/4$
- C.  $3/4$
- D.  $4/3$

57

if P and Q are fixed points and X is a point which moves so that  $XP = XQ$ , the locus of X is

- A. A straight line
- B. a circle
- C. the bisector of angle PXQ
- D. the perpendicular bisector of PQ

58

In a regular polygon, each interior angle doubles its corresponding exterior angle. Find the number of sides of the polygon.

- A. 8
- B. 6
- C. 4
- D. 3

59

A predator moves in a circle of radius  $\sqrt{2}$  centre (0,0), while a prey moves along the line  $y = x$ . If  $0 \leq x \leq 2$ , at which point(s) will they meet?

- A. (1,1) only
- B. (1,1) and (1,2)
- C. (0,0) and (1,1)
- D.  $(\sqrt{2}, \sqrt{2})$  only

60

Find the value of  $\int_0^{\pi} \frac{\cos^2 \theta - 1}{\sin \theta} d\theta$

- A.  $\pi$
- B.  $\pi/2$
- C.  $-\pi/2$
- D.  $-\pi$

61

If  $y = 2x - \sin 2x$ , find  $dy/dx$  when  $x = \pi/4$

- A.  $\pi$
- B.  $-\pi$
- C.  $\pi/2$
- D.  $-\pi/2$

62

A bowl is designed by revolving completely the area enclosed by  $y = x^2 - 1$ ,  $y = 3$  and  $x \geq 0$  around the axis. What is the volume of this bowl?

- A.  $7\pi$  cubic units
- B.  $15\pi/2$  cubic units
- C.  $8\pi$  cubic units
- D.  $17\pi/2$  cubic units

63

If the volume of a hemisphere is increasing at a steady rate of  $18\pi$  m/s, at what rate is its radius changing when it is 6m?

- A. 2.30m/s
- B. 2.00 m/s
- C. 0.25 m/s
- D. 0.20 m/s

64

X and Y are two events. The probability of X or Y is 0.7 and that of X is 0.4. If X and Y are independent, find the probability of Y.

- A. 0.30
- B. 0.50
- C. 0.57
- D. 1.80



65

If the mean of the numbers 0,  $(x+2)$ ,  $(3x+6)$ , and  $(4x+8)$  is 4, find their mean deviation.

- A. zero
- B. 2
- C. 3
- D. 4

66

In how many ways can the word MATHEMATICS be arranged?

- A.  $\frac{11!}{(9! 2!)}$
- B.  $\frac{11!}{(9! 2! 2!)}$
- C.  $\frac{11!}{(2! 2! 2!)}$
- D.  $\frac{11!}{(2! 2!)}$

67

Given that the various faces of a fair dice 1, 2, 3, 4, 5, 6 appeared 30, 43, 54, 40, 41, 32 times respectively in a single toss. Picture the figures as being represented in a simple table with number (X) against frequency (f).

If a pie chart is used to depict the data, the angle corresponding to 4 is?

- A.  $10^\circ$
- B.  $16^\circ$
- C.  $40^\circ$
- D.  $60^\circ$

68

If  $U = \{x : x \text{ is an integer and } 1 \leq x \leq 20\}$

$E_1 = \{x : x \text{ is a multiple of 3}\}$

$E_2 = \{x : x \text{ is a multiple of 4}\}$

and an integer is picked at random from U, find the probability that it is not in  $E_2$

- A.  $3/4$
- B.  $3/10$
- C.  $1/4$
- D.  $1/20$

69

The variance of  $x$ ,  $2x$ ,  $3x$ ,  $4x$  and  $5x$  is

- A.  $x\sqrt{2}$
- B.  $2x^2$
- C.  $x^2$
- D.  $3x$

70

Find the sum of the range and the mode of the set of numbers 10, 9, 10, 9, 8, 7, 7, 10, 8, 10, 8, 4, 6, 9, 10, 9, 10, 9, 7, 10, 6, 5

- A. 16
- B. 14
- C. 12
- D. 10

71

In how many ways can a delegation of 3 be chosen from among 5 men and 3 women, if at least one man and at least one woman must be included?

- A. 15
- B. 28
- C. 30
- D. 45

72

A function  $f(x)$  passes through the origin and its first derivative is  $3x + 2$ . What is  $f(x)$ ?

- A.  $y = (3x^2)/2 + 2x$
- B.  $y = (3x^2)/2 + x$
- C.  $y = 3x^2 + (x/2)$
- D.  $y = 3x^2 + 2x$

73

The expression  $ax^2 + bx + c$  equals 5 at  $x = 1$ . If its derivative is  $2x + 1$ , what are the values of  $a$ ,  $b$ ,  $c$  respectively?

- A. 1, 3, 1
- B. 1, 2, 1
- C. 2, 1, 1
- D. 1, 1, 3

74

Evaluate  $21.05347 - 1.6324 \times 0.43$  to 3 decimal places

- A. 20.980
- B. 20.351
- C. 20.981
- D. 20.352

75

Simplify  $(\sqrt[3]{64a^3})^{-1}$

- A.  $4a$
- B.  $1/8a$
- C.  $8a$
- D.  $1/41$

76

Given that  $p=1+\sqrt{2}$  and  $q=1-\sqrt{2}$ , evaluate  $\frac{(p^2-q^2)}{2pq}$

- A.  $2(2+\sqrt{2})$
- B.  $-2(2+\sqrt{2})$
- C.  $2\sqrt{2}$
- D.  $-2\sqrt{2}$

77

A car dealer bought a second-hand car for N250,000 and spent N70,000 refurbishing it. He then sold the car for N400,000. What is the percentage gain?

- A. 60%
- B. 32%
- C. 25%
- D. 20%

78

If  $x = \frac{y}{2}$  evaluate  $(\frac{x^3}{y^3} + \frac{1}{2}) \div (\frac{1}{2} - \frac{x^2}{y^2})$

- A.  $5/8$
- B.  $5/2$
- C.  $5/4$
- D.  $5/16$

79

Find the principal which amounts to N5,500 at a simple interest in 5 years at 2% per annum.

- A. N4,900
- B. N5,000
- C. N4,700
- D. N4,800

80

Evaluate  $(0.14^2 \times 0.275) \div (0.02)$  to 3 decimal places.

- A. 0.039
- B. 0.358
- C. 0.033
- D. 0.308

81

Divide:  $ax^{3x} - 26x^{2x} + 156a^x - 216$  by  $a^{2x} - 24a^x + 108$

- A.  $a^x - 2$
- B.  $a^x + 2$

- C.  $a^x - 8$
- D.  $a^x - 6$

82

If two graphs  $y = px^2 + q$  and  $y = 2x^2 - 1$  intersect at  $x = 2$ , find the value of  $p$  in terms  $q$ .

- A.  $\frac{q-8}{7}$
- B.  $\frac{7-q}{4}$
- C.  $\frac{8-q}{2}$
- D.  $\frac{7+q}{8}$

83

Find the integral values of  $x$  and  $y$  satisfying the inequality  $3y + 5x \leq 15$ , given that  $y > 0$ ,  $y < 3$  and  $x > 0$ .

- A. (1,1), (1,2), (1,3)
- B. (1,1), (2,1), (1,3)
- C. (1,1), (3,1), (2,2)
- D. (1,1), (1,2), (2,1)

84

Solve the equations  $m^2 + n^2 = 29$ ,  $m + n = 7$

- A. (2, 3) and (3, 5)
- B. (2, 5) and (5, 2)
- C. (5, 2) and (5, 3)
- D. (5, 3) and (3, 5)

85

An operation  $*$  is defined on the set of real numbers by  $a*b = a + b + 1$ . If the identity elements is  $-1$ , find the inverse of the element 2 under  $*$ .

- A. 4
- B. zero
- C. -2
- D. -4

86

The sixth term of an A.P is half of its twelfth term. The first term of the A.P is equal to

- A. zero
- B. half of the common difference
- C. double the common difference
- D. the common difference

87

Factorize  $4x^2 - 9y^2 + 20x + 25$

- A.  $(2x - 3y + 5)(2x - 3y - 5)$
- B.  $(2x - 3y)(2x + 3y)$
- C.  $(2x - 3y + 5)(2x + 3y + 5)$
- D.  $(2x + 5)(2x - 9y + 5)$

88

a sector of a circle of radius 7.2cm which subtends an angle of  $300^\circ$  at the centre is used to form a cone. What is the radius of the base of the cone?

- A. 8cm
- B. 6cm
- C. 9cm
- D. 7cm

89

A point P moves such that it is equidistant from Points Q and R. Find QR when  $PR = 8\text{cm}$  and angle  $PRQ = 30^\circ$

- A.  $4\sqrt{3}\text{cm}$
- B. 8cm
- C.  $8\sqrt{3}\text{cm}$
- D. 4cm

90

A straight line makes an angle of  $30^\circ$  with the positive x-axis and cuts the y-axis at  $y = 5$ . Find the equation of the straight line.

- A.  $y = (x/10) + 5$
- B.  $y = x + 5$
- C.  $\sqrt{3}y = -x + 5\sqrt{3}$
- D.  $\sqrt{3}y = x + 5\sqrt{3}$

91

Given an isosceles triangle with length of 2 equal sides  $t$  units and opposite side  $\sqrt{3}t$  units with angle  $\theta$ . Find the value of the angle  $\theta$  opposite to the  $\sqrt{3}t$  units.

- A.  $100^\circ$
- B.  $120^\circ$
- C.  $30^\circ$
- D.  $60^\circ$

92

Find the value of P if the line joining (P, 4) and (6, -2) is perpendicular to the line joining (2, P) and (-1, 3).

- A. 4
- B. 6
- C. 3
- D. zero

93

Find the number of sides of a regular polygon whose interior angle is twice the exterior angle.

- A. 6
- B. 2
- C. 3
- D. 8

94

P(-6, 1) and Q(6, 6) are the two ends of the diameter of a given circle. Calculate the radius.

- A. 6.5 units
- B. 13.0 units
- C. 3.5 units
- D. 7.0 units

95

The bearings of P and Q from a common point N are  $020^\circ$  and  $300^\circ$  respectively. If P and Q are also equidistant from N, find the bearing of P from Q.

- A.  $040^\circ$
- B.  $070^\circ$
- C.  $280^\circ$
- D.  $320^\circ$

96

A cylindrical tank has a capacity of  $3080 \text{ m}^3$ . What is the depth of the tank if the diameter of its base is 14 m?

(Take  $\pi = 22/7$ )

- A. 23 m
- B. 25 m
- C. 20 m
- D. 22 m

97

Find the locus of a point which moves such that its distance from the line  $y = 4$  is a constant, k.

- A.  $y = k + \text{or} - 4$
- B.  $y = 4 + \text{or} - k$
- C.  $y = 4 + k$
- D.  $y = k - 4$

98

The chord ST of a circle is equal to the radius, r, of the circle. Find the length of arc ST.

- A.  $\pi r/6$
- B.  $\pi r/2$
- C.  $\pi r/12$

- D.  $\pi/3$

99

If the gradient of the curve  $y = 2kx^2 + x + 1$  at  $x = 1$  is 9, find  $k$ .

- A. 4
- B. 3
- C. 2
- D. 1

100

Evaluate  $\int 2(2x-3)^{2/3} dx$

- A.  $3/5(2x-3)^{5/3} + k$
- B.  $6/5(2x-3)^{5/3} + k$
- C.  $2x-3+k$
- D.  $2(2x-3)+k$

101

Differentiate  $(2x+5)^2(x-4)$  with respect to  $x$ .

- A.  $4(2x+5)(x-4)$
- B.  $4(2x+5)(4x-3)$
- C.  $(2x+5)(2x-13)$
- D.  $(2x+5)(6x-11)$

102

Find the area bounded by the curves  $y = 4 - x^2$  and  $y = 2x + 1$

- A.  $20(1/3)$  sq. units
- B.  $20(2/3)$  sq. units
- C.  $10(2/3)$  sq. units
- D.  $10(1/3)$  sq. units

103

Find the rate of change of the volume,  $V$  of a sphere with respect to its radius,  $r$  when  $r = 1$ .

- A.  $12\pi$
- B.  $4\pi$
- C.  $24\pi$
- D.  $8\pi$

104

If  $y = x \sin x$ , find  $dy/dx$  when  $x = \pi/2$ .

- A.  $-\pi/2$
- B. -1
- C. 1
- D.  $\pi/2$

105

Find the dimensions of a rectangle of greatest area which has a fixed perimeter  $p$ .

- A. square of sides  $p$
- B. square of sides  $2p$
- C. square of sides  $(p/2)$
- D. square of sides  $(p/4)$

106

Given the scores: 4, 7, 8, 11, 13, 8 with corresponding frequencies: 3, 5, 2, 7, 2, 1 respectively. Find the square of the mode.

- A. 49
- B. 121
- C. 25
- D. 64

107

Given the scores: 4, 7, 8, 11, 13, 8 with corresponding frequencies: 3, 5, 2, 7, 2, 1 respectively. Find the square of the mode.

- A. 49
- B. 121
- C. 25
- D. 64

108

Given the scores: 4, 7, 8, 11, 13, 8 with corresponding frequencies: 3, 5, 2, 7, 2, 1 respectively. The mean score is

- A. 7.0
- B. 8.7
- C. 9.5
- D. 11.0

109

Teams P and Q are involved in a game of football. What is the probability that the game ends in a draw?

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

110

If  ${}^6P_r = 6$ , find the value of  ${}^6P_{r+1}$

- A. 30
- B. 33
- C. 35
- D. 15





## ANSWER

- 
- |     |   |     |   |      |   |
|-----|---|-----|---|------|---|
| 1.  | B | 43. | D | 85.  | D |
| 2.  | A | 44. | D | 86.  | D |
| 3.  | C | 45. | C | 87.  | C |
| 4.  | A | 46. | C | 88.  | B |
| 5.  | D | 47. | C | 89.  | C |
| 6.  | D | 48. | A | 90.  | D |
| 7.  | B | 49. | B | 91.  | B |
| 8.  | B | 50. | D | 92.  | D |
| 9.  | D | 51. | D | 93.  | A |
| 10. | B | 52. | D | 94.  | A |
| 11. | C | 53. | B | 95.  | B |
| 12. | B | 54. | D | 96.  | C |
| 13. | A | 55. | C | 97.  | A |
| 14. | A | 56. | A | 98.  | D |
| 15. | C | 57. | D | 99.  | C |
| 16. | A | 58. | B | 100. | A |
| 17. | B | 59. | A | 101. | D |
| 18. | C | 60. | D | 102. | D |
| 19. | B | 61. | D | 103. | B |
| 20. | C | 62. | B | 104. | C |
| 21. | C | 63. | C | 105. | D |
| 22. | B | 64. | A | 106. | B |
| 23. | C | 65. | C | 107. | B |
| 24. | C | 66. | C | 108. | B |
| 25. | D | 67. | D | 109. | D |
| 26. | E | 68. | A | 110. | A |
| 27. | D | 69. | B |      |   |
| 28. | C | 70. | A |      |   |
| 29. | A | 71. | D |      |   |
| 30. | B | 72. | A |      |   |
| 31. | C | 73. | D |      |   |
| 32. | C | 74. | D |      |   |
| 33. | C | 75. | D |      |   |
| 34. | B | 76. | D |      |   |
| 35. | C | 77. | C |      |   |
| 36. | B | 78. | B |      |   |
| 37. | B | 79. | B |      |   |
| 38. | C | 80. | A |      |   |
| 39. | B | 81. | A |      |   |
| 40. | D | 82. | B |      |   |
| 41. | A | 83. | D |      |   |
| 42. | C | 84. | B |      |   |