**FEDERAL GOVERNMENT COLLEGE ODI**

**MATHEMATICS HOLIDAY ASSIGNMENT**

**3RD TERM EXAMINATION**

**SS 1-3**

1. The gradient of the lines joining the points (5,3) (0,0) is

(a) 1/2 (b) 2/3 (c)3/5 (d)1/4

2. Calculate the intercept of the straight-line equation 4x + 2y =5 (a) 2 1/2 (b) 3 (c) 1 (d) 1/2

3. The gradient of the line in question 4 is

(a) 3 (b) 2 (c) -2 (d) 1

4. Find the equation of a straight line passing through the point (-3,2) with gradient -1/3

(a) x + 3y - 3 = 0 (b) 2x + y + 4 = 0 (c) 3x - 2y + 6 = 0 (d) x -y + 5 = 0

5. Solve the inequality 3x - 4 > 8

(a) x < 3 (b) x > 4 (c) x > 5 (d) x < 1

6. Find the value x if x + 3 < 4x

(a) x < 1 (b) x > 2 (c) x < (d) x > 5

7. Solve the inequality 1/2(x+3)< 3

(a) x > 2 (b) x < 3 (c) x > 5 (d) x < 6

8. Solve the equation 3(2x - 7)= 2(x - 8)

(a) 2 1/4 (b) 4/5 (c) 1 1/4 (d) 3/4

9. Solve the equation 3b/9 + 1/2= 3/4 + b/4

(a) -3 (b) -2 (c) 2 (d) 3

10. Find the value of x for which the fraction (4x+9)/7 equal to zero (a) 7/8 (b) -9/4 (c) 3/4 (d) -2/3

11. For what value of a is the expression undefined (3a+5)/(a+2) (a)-4 (b)-3 (c) -2 (d) -1

12. If (3y-4x)/(4y-3x) = 5, evaluate x/y

(a) 17/11 (b) 16/11 (c) 16/17 (d) 3/4

13. If 1/x + 1/y = 1/3 Find y when x=5

(a) 6 1/2 (b) 7 1/2 (c) 3/4 (d) 3/4

14. Solve for x if x/4 = x/6 + 2/3

(a) 3 (b) 4 (c) 6 (d) 8

15. In a circle of radius 17cm, calculate the length of a chord which is 8cm from the centre

(a) 20cm (b) 25cm (c) 30cm (d) 40cm

16. Find the radius of a circle, if a chord 24cm long is 5cm distant from the centre

(a) 13cm (b) 11cm (c) 10cm (d) 8cm

17. Calculate the sum of the opposite angles of a cyclic quadrilateral is

(a) 90o (b) 120o (c) 180o (d) 270o

18. If 2 + x < 6 and 7 + x > 4. What is the range of x satisfying both inequalities?

(a) -3 < x < 2 (b) -2 < x < 1 (c) -4 < 1 (d) -1 < x < 2

19. A school contains 357 boys and 323 girls.
If a student is chosen at random, what is the probability that is a girl?
Correct your answer to 2 decimal places.
A. 0.32 B. 0.40 C. 0.48 D. 0.50 E. 0.53

20. A pair of unbiased dice is thrown once.
What is the probability of getting a total score of seven?
A. 5/6 B. ½ C. 1/3 D. 7/36 E. 1/6

21. A fair coin and unbiased die is tossed and thrown respectively. What is the probability of getting a head and a perfect square?
A. 1/12 B. 1/6 C. 1/3 D. ½ E. 2/3

22. Determine the mean deviation of the following numbers: 2, 4, 6, 8, 10, 12.
A. 2.4 B. 2.6 C. 3.0 D. 3.4 E. 6.0

23. Given that y = x4 + 4×2 – 2x + 1, find dy/dx at x = 1
A. 15 B. 14 C. 13 D. 12 E. 11

24. Calculate the area enclosed between the x axis and the curve y = (x – l)(x-2) in the interval
0 < x < 3.
A. 5 1/2 square units B. 6 1/2 square units C. 7 1/2 square units
D. 8 1/2 square units E. 9 1/2 square units

25.The bearing of A from B is 074°.What is the bearing of B from A?
A. 164° B. 254° C. 268° D. 281° E. 310°

26. A chord 8 cm long is 3 cm from the centre of a circle. Calculate the radius of the circle.
A. 2cm B. 3cm C. 4cm D. 5cm E. 6cm

27. If the sector of a circle of radius 14 cm has an area of 385 cm2, calculate the angle of the sector.
A. 325° B. 300° C. 225° D. 215° E. 145°

28. Calculate the surface area of a sphere whose diameter is 9.8 cm.
A. 1479.02 cm2 B. 1301.84 cm2 C. 493.00 cm2 D. 301.84 cm2 E. 100.61 cm2

29. If the interior angles of a y sided regular polygon are 140″ each, what is the name of the polygon?
A. Hexagon B. Heptagon C. Octagon D. Nonagon E. Decagon

30, If the diagonals of a rhombus are 16 cm and 12 cm, calculate the perimeter of the rhombus.
A. 20 cm B. 40 cm C. 60 cm D. 80 cm E. 100 cm

31. If Q varies directly as the square of P and Q = 8 when P = /2, find Q when P = 4.
A. 8 D. 12 C. 16 D. 32 E. 64

32. Solve the inequality 2(x+1) > 1/3 (4x + 3)
A. x > – 2/3 B. x > – 3/2 C. x < – 2/3 D. x < 3/2 E. x > 3/2

33. if 2k2 + mk + 25/8 = 0 has equal roots, find the positive value of m.
A. 2 B. 4 C. 5 D. 8 E. 25

34. Find the positive value of x for which the expression
12×2 – 4x / x2 -2x -3 is not defined.
A. 9 B. 3 C. 2 D. 1 E. 0

35. Factorize 3×2 + 5x – 8
A. (3x – 8) (x + 1) B. (3x + 8) (x -1 ) C. (3x + 8) (x + 1) D. (3x – 8) (x – 1) E. (x + 8) (x – 8)

36. If Logx (1 / 8) = - 3 / 2, then x is equal to
A. - 4 B. 4 C. 1 / 4 D. 10

37. 20 % of 2 is equal to
A. 20 B. 4 C. 0.4 D. 0.04

38. If Log 4 (x) = 12, then log 2 (x / 4) is equal to
A. 11 B. 48 C. -12 D. 22

39.The population of a country increased by an average of 2% per year from 2000 to 2003. If the population of this country was 2 000 000 on December 31, 2003, then the population of this country on January 1, 2000, to the nearest thousand would have been
A. 1 846 000 B. 1 852 000 C. 1 000 000 D. 1 500 000

40. f is a quadratic function whose graph is a parabola opening upward and has a vertex on the x-axis. The graph of the new function g defined by g(x) = 2 - f(x - 5) has a range defined by the interval
A. [ -5 , + infinity) B. [ 2 , + infinity) C. ( - infinity , 2] D. ( - infinity , 0]

41. f is a function such that f(x) < 0. The graph of the new function g defined by g(x) = | f(x) | is a reflection of the graph of f
A. on the y axis B. on the x axis C. on the line y = x D. on the line y = - x

42. If the graph of y = f(x) is transformed into the graph of 2y - 6 = - 4 f(x - 3), point (a , b) on the graph of y = f(x) becomes point (A , B) on the graph of 2y - 6 = - 4 f(x - 3) where A and B are given by
A. A = a - 3, B = b B. A = a - 3, B = b C. A = a + 3, B = -2 b D. A = a + 3, B = -2 b +3

43. When a parabola represented by the equation y - 2x 2 = 8 x + 5 is translated 3 units to the left and 2 units up, the new parabola has its vertex at
A. (-5 , -1) B. (-5 , -5) C. (-1 , -3) D. (-2 , -3)

44. The graphs of the two linear equations a x + b y = c and b x - a y = c, where none of the coefficients a, b, c is equal to zero,
A. are parallel B. intersect at the point (0,0) C. intersect at two points
D. perpendicular

45. For x greater than or equal to zero and less than or equal to 2 π, sin x and cos x are both decreasing on the intervals
A. (0 , π/2) B. (π/2 , π) C. (π , 3 π / 2) D. (3 π / 2 , 2 π)

46. The three solutions of the equation f(x) = 0 are -2, 0, and 3. Therefore, the three solutions of the equation f(x - 2) = 0 are
A. - 4, -2, and 1 B. -2, 0 and 3 C. 4, 2, and 5 D. 0, 2 and 5

47. The three solutions of the equation f(x) = 0 are - 4, 8, and 11. Therefore, the three solutions of the equation f(2 x) = 0 are
A. - 2, 4, and 11/2 B. - 8, 16 and 22 C. - 4, 8, and 11 D. 2, 19 / 2 and 7 / 2

48.A school committee consists of 2 teachers and 4 students. The number of different committees that can be formed from 5 teachers and 10 students is
A. 10 B. 15 C. 2100 D. 8

49. Five different books (A, B, C, D and E) are to be arranged on a shelf. Books C and D are to be arranged first and second starting from the right of the shelf. The number of different orders in which books A, B and E may be arranged is
A. 5! B. 3! C. 2! D. 3! \* 2!

50. The mean of a data set is equal to 10 and its standard deviation is equal to 1. If we add 5 to each data value, then the mean and standard deviation become
A. mean = 15 , standard deviation = 6
B. mean = 10 , standard deviation = 6
C. mean = 15 , standard deviation = 1
D. mean = 10 , standard deviation = 1

51. The exam scores of all 500 students were recorded and it was determined that these scores were normally distributed. If Jane's score is 0.8 standard deviation above the mean, then how many, to the nearest unit, students scored above Jane?
A. 394 B. 250 C. 400 D. 106

52. If f(x) is an odd function, then | f(x) | is
A. an odd function B. an even function
C. neither odd nor even D. even and odd

53. The period of | sin (3x) | is
A. 2 π B. 2 π / 3 C. π / 3 D. 3 π

54. When a metallic ball bearing is placed inside a cylindrical container, of radius 2 cm, the height of the water, inside the container, increases by 0.6 cm. The radius, to the nearest tenth of a centimeter, of the ball bearing is
A. 1 cm B. 1.2 cm C. 2 cm D. 0.6 cm

55.The period of 2 sin x cos x is
A. 4 π 2 B. 2 π C. 4 π D. π

56.The probability that an electronic device produced by a company does not function properly is equal to 0.1. If 10 devices are bought, then the probability, to the nearest thousandth, that 7 devices function properly is
A. 0.057 B. 0.478 C. 0.001 D. 0

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57.. Look at this series: 2, 1, 12, 14 ,… What number should come next?
A. 13 B. 18 C. 28 D. 116 E. 132

58. 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

59. If log 10 to base 8 = X, evaluate log 5 to base 8 in terms of X.
A. 12 X B. X-14 C. X-13 D. X-12

60. Find the value of X if 2√x+2√=1x−2√
A. 3√2+4 B. 3√2-4 C. 3-2√2 D. 4+2√2

61.. If (a2b−3c)34a−1b4c5=apbqcr What is the value of p+2q?
A. (5/2) B. -(5/4) C. -(25/4) D. -10

62. If {(a2b-3c)3/4/a-1b4c5} = apbqcr; what is the value of p+2q?
A. (5/2) B. -(5/4) C. -(25/4) D. -10

63. 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

64. What is the answer when 24346 is divided by 426?
A. 236 B. 356 C. 526 D. 556

65. If 29 x (3Y)9 = 35 x (3Y)5, find the value of Y.
A. 4 B. 3 C. 2 D. 1

66. 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

67. 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. ½ C. -1/2 D. -2/3

68. Factorize completely X2+2XY+Y2+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)

69.. 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≤X≤5 B. 5≤X≤8 C. 5≤X≤10 D. 8≤X≤10

70. Three consecut[i](http://techdrillers.com/)ve positive integers k, l and m are such that l2 = 3(k+m). Find the value of m
A. 4 B. 5 C. 6 D. 7

SECTION B: THEORY

ANSWER FOUR QUESTIONS

1. Find the range of values of 2x -1 < 3 and 2 - x < 5.

2. Calculate the length of a chord of a circle of radius 13cm if the chord is 12cm from the centre of the circle

3a. Find the value of x for which the fraction is undefined (x+5)/(3x-1)

3b. Simplify 2/x-1 - -3/x-2

4.Find the gradient of the line passing through the points P(1,1) and Q(2,5)

5a. Simplify 3/4 + 5/(x-2)

5b. Simply 8/7x - 9/6x + 3/4x

6. Use the logarithm table to evaluate
square root of 0.0024 x 35000 / 0.0105

7a. if the roots of a quadratic equation are -2/3 and -3/2 find the equation.
7b. Given the Matrix R = 3 4 0, 2 0 3, 1 2 2, Find
i. 2/3 R
ii. R
iii. The transpose of R

8a. Find the equation of a straight line passing through the points R(3, 5) and S (-2, -6)
8b. Calculate the length RS in 3 (a) above, correct to 2 decimal places

9a.. Find the gradient of the tangent to the curve y = x2 – 3x at the point (2, -2)
9b. Differentiate 1+x2/1-x2 with respect to x

10. A bag contains 6 blue and 10red Identical balls, if two balls are drawn at random one after the other without replacement, find the probability that the two balls are of
i. The same colour
ii. Different colours

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11. A = {2, 4, 6, 8}, B = {2, 3, 7, 9} and C = {x: 3 < x < 9} are subsets of the universal-set
U = {2, 3, 4, 5, 6, 7, 8, 9}. Find
(a) A n(B’nC’);
(b) (AuB) n(BuC).

12. In the diagram above, the points A, B, C and D lie on the circle, centre O. TA and TB are tangents touching the circle at A and B respectively.
AÔB = 132°, AĈD = 59° and AOC is a straight line.

(a) Find ATB.
(b) Find BDA.(c) Find BDC.
(d) Find OBD.

13 (a) The probability that a malaria patient (M) survives when administered with a newly discovered drug is 0.27 and the probability that a thyphoid patient (T) survives when injected with another newly discovered drug is 0.85.  What is the probability that;
i. either of the two patients survives?
ii. of two patients survive?
iii. at least one of the two patients survive?
(b) Give your answers correct to 2 significant figures.

14. The frequency distribution of the weight of 100 participants in a high jump competition is as
shown below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Weight (kg) | 20-29 | 30 – 39 | 40 – 49 | SO – 59 | 60 – 69 | 70-79 |
| Number of |  |  |  |  |  |  |
| pa rtici pa nts | 10 | 18 | 22 | 25 | 16 | 9 |

(a) Construct the cumulative frequency table.
(b) Draw the cumulative frequency curve.
(c)   From the curve, estimate the:
(i)   median;
(ii) semi-interquartile range;
(iii) probability that a participant chosen at random weighs at least 60 kg.

15. Using ruler and a pair of compasses only:
(a) construct a triangle PQR with /PQ/ = 10cm, ∠QPR= 90° and∠PQR = 30°;

(b) (i) construct I, the locus of all points equidistant from PR and QR;
(ii) locate M, the point where / intersects with po,

(c) (i) with M as centre and radius MP, draw a circle;
(ii) calculate the area of the circle correct to one decimal place.
[Take Π= 22/7].

16. A sector of angle 135° is removed from a thin circular metal sheet of radius 40cm. It is then folded with the straight edges coinciding to form a right circular cone. Calculate the:
(a) base radius of the cone, correct to two decimal places.
(b) greatest volume of liquid which the cone can hold, leaving your answer correct to the nearest cm3. (Take p = 22/7).

17. (a) P varies directly as Q and inversely as the square of R.  If P = 1 when Q = 8 and R = 2, find the value of Q when P = 3 and R = 5.

(b) An aeroplane flies from town A(20oN, 60oE) to town B(20oN, 20oE).
(i) If the journey takes 6 hours, calculate, correct to 3 significant figures, the average speed of the aeroplane.
(ii) If it then flies due north from town B to town C, 420 km away, calculate, correct to the nearest degree, the latitude of town C.
[Take radius of the earth = 6400 km and  π = 3.142]

18. Two fair dice are thrown.
M is the event described by “the sum of the scores is 10” and
N is the event described by “the difference between the scores is 3”.
(a) Write out the elements of M and N.
(b) Find the probability of M or N.
(c) Are M and N mutually exclusive? Give reasons.

19. (a) In a class of 50 students, 30 offered History, 15 offered History and Geography while 3 did not offer any of the two subjects.
(i)Represent the information on a Venn diagram.
(ii)Find the number of candidates that offered:
(A) History only;
(B) Geography only.

(b) A trader sold an article at a discount of 8% for N 828.00. If the article was initially marked to gain 25%, find the
(i)cost price of the article;
(ii)discount allowed.

20. The area of a rectangular football field is 7200m2 while its perimeter is 360m.  calculate the:
(a) dimensions of the field;
(b) cost of clearing the field at N6.50 per square meter, leaving a margin of 2m wide along the longer sides;
(c) percentage of the part not cleared.

21. (a) Given the Arithmetic Sequence -6, -2 , 1, …, 71, find the:
(i) common difference;
(ii) number of terms of the sequence
(b) The difference between the third and first terms of a Geometric Progression (G. P.) is 42. If the fourth term is greater than the second term by 168, find the:
(i) first term;
(ii) fourth term of the distribution.

22. The table below shows the distribution of marks scored by students in an examination.

|  |  |
| --- | --- |
| Class interval | Frequency |
| 60 – 6465 – 6970 – 7475 – 7980 – 8485 – 8990 – 9495 – 99 | 236118721 |

Calculate, correct to 2 decimal places, the
(a) mean;
(b) standard deviation of the distribution.
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