MULTIPLE CHOICE

1. The equation$|z - 3| + |z + 3| = 4$ represents what kind of curve?
   A. Parabola C. Hyperbola
   B. Ellipse D. Circle

2. Find the area between Find the volume generated when the area enclosed by $(x - 3)^2 + (y - 2)^2 = 1$ is revolved about the y – axis.
   A. $6\pi^2$ C. $4\pi^2$
   B. $5\pi^2$ D. $2\pi^2$

3. In a certain study about 2 pollutants, it is found out that pollutant A has 30% chance of polluting in a day. Pollutant B has 25% chance of polluting. The 2 pollutants do not pollute on the same day. At any given day, if pollutant, what is the probability that Pollutant B is also polluting
   A. 30% C. 5%
   B. 25% D. 0

4. Evaluate sin3x if sinx = 2
   A. 4 C. 6
   B. – 3 D. – 7

5. Evaluate $\int_0^{\frac{\pi}{2}} \sin^5 \cos^3 x \, dx$
   A. 2.3873 C. 0.04167
   B. 4.0493×10^9 D. 0.1524

6. There are 4 cups containing 5/7 (cup 1), ¾ (cup 2), 11/12 (cup 3), 8/9 (cup 4) of coffee, If using the amount of coffee in cup 4 to fill the other 3 cups, how much will be left to cup 4?
   A. ½ C. 104/189
   B. 13.21 D. 17/63

7. Ana owned a book of 340 pages. How many pages did she finish reading if she already read 30% of it?
   A. 142 C. 102
   B. 133 D. 113

8. 78 is 39% of what number?
   A. 30.42 C. 267
   B. 234 D. 200

9. Carbon extracted from the ancient skull contained only 1/6 as much radioactive ^{14}C as carbon extracted from the present day bone. How old is the skull?
   A. 14, 735 years C. 1,499 years

B. 15, 735 years D. 2,499 years

10. The weight of Mathematics in the Electrical Engineering Board Examination is _____
    A. 25% C. 30%
    B. 20% D. 45%

11. There are 15 five – part multiple choice test questions. In order to pass the quiz at least 11 questions must be answered correctly. What is the probability of passing the quiz?
    A. $1.246x10^{-6}$ C. $1.999x10^{-9}$
    B. $2.643\ x10^{-5}$ D. $6.346\ x\ 10^{-3}$

12. Find the volume generated when the area between $\sqrt{x}+\sqrt{y}=\sqrt{a}$ and x + y = a is revolved with respect to the x – axis.
    A. $1/6\ \pi a^{3/2}$ C. $1/3\ \pi a^{3/2}$
    B. $4/15\ \pi a^{3}$ D. $5/16\ \pi^{2}$

13. Given x = t^2 – 1. Y = t^3(t^2 – 1), find the area enclosed with x – axis.
    A. 0.5714 C.0.5174
    B. 1.615 D. 1.516

14. Find the area enclosed between $y = 4x^2$ and $x = 4y^2$.
    A. 4.33 C. 2.33
    B. 3.33 D. 5.33

15. Integral of tan2θdθ from 0 to pi/2 is
    A. 0 C. infinity
    B. – 1 D. indeterminate

16. The equation |z – 4| + |z + 3| = 10 represents which of the following curves?
    A. Circle C. line
    B. Ellipse D. Hyperbola

17. What is the coordinate of the vertex of the curve $y^2 = 8x$?
    A. 0, 0 C. 2, 0
    B. 0, 2 D. 8, 0

18. What is the coordinate of the focus of the curve $y^2 = 8x$?
    A. 0, 0 C. 2, 0
    B. 0, 2 D. 8, 0

19. Find the area in [cm^2] of a regular octagon inscribed in a circle of radius 10cm.
    A. 283 C. 298
    B. 289 D. 238

20. What is the value of log to base 10 of 1000^{33}?
    A. 10.9 C. 99
    B. 999 D. 9.5

21. If $\log_x 10 = 0.25$, what is the value of $10_{10}a$?
    A. 2 C. 6
    B. 4 D. 8

22. The area bounded by the curve $y^2 = x$ and the line $x - 4 = 0$
    A. 11 C. 10
    B. 31/3 D. 8

23. Find the differential equation of the family of the parabola with vertex at the origin and focus at x – axis.
    A. 2xdy = ydx C. 2xdy = xdy
    B. 2ydy = ydx D. 2ydx = xdy

24. 12[cos45° + jsin 45°] + 3[cos15° = jsin15°]
    A. $2\sqrt{3}+j2$ C. $2\sqrt{3}-j2$
    B. $\sqrt{2}+j3$ D. $\sqrt{2}-j3$

25. Find the area between $\sqrt{x}+\sqrt{y}=\sqrt{a}$ and x + y = a.
    A. 1/6a C. $1/3a^2$
    B. 6/5a D.$15/16a^2$

26. Evaluate the limit of $(z - 1 - i)^2$ all over (z – 1 – i)(z – 1 + i) as z approaches (1 + i)
    A. 0 C. 1 – i
    B. – 1 – I D. – 0.51i

27. What is the area bounded by the curve $y^2 - 12x = 0$ and the line x = 3 is revolved about the line x = 3.What is the volume generated?
    A. 179 C. 183
    B. 181 D. 185

28. Find the value of x in $(x - y)^3$ where x = 3 + y?
    A. – 12 C. 12
    B. – 27 D. 27

29. What is the length of the shortest line that can be drawn tangent to $x^2/9 + y^2/16 = 1$ and meeting the coordinate axes.
    A. 5 C. 7
    B. 10 D. 8

30. A machine can only accept a P5-peso coin as payment for purchases. A person bought 2 chocolate bars at P55 each, a box of candy at P25 per box and a package of gummy bars at P40 each per package. How many P5 coins does he need to pay his purchases?

A. 35 C. 70
B. 21 D. 27

31. Evaluate cos3x if sinx = 2

A. $j\,14\sqrt{3}$ C. $16\sqrt{3}$
B. $-j\,3\sqrt{3}$ D. $-j\,15\sqrt{3}$

32. The distance of a point from the y-axis is called _____.

A. Abscissa C. x – intercept
B. y – intercept D. ordinate

33. A boat can go 12 kph in still water. Going full speed, it goes 25 km upstream in the same time it takes to go 35 km downstream. What is the rate of the speed?

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

34. A janitor carrying a ladder is going to a perpendicular hallway. The width of the first hallway is 15.5m and the smaller connecting perpendicular wall is 8.5m. Find the longest length of the ladder he can carry along the wall without getting stuck?

A. 33.45m C. 2.94m
B. 18.75m D. 8.48m

35. Find the inverse of $\begin{bmatrix} -2 & -1 & 3 \\ -1 & 3 & -5 \\ 3 & -5 & 4 \end{bmatrix}$

A. (13/49) $\begin{bmatrix} -13 & -11 & -4 \\ 11 & 17 & -13 \\ -4 & -13 & -7 \end{bmatrix}$ C. (– 1/25) $\begin{bmatrix} -13 & -11 & -4 \\ -11 & -17 & -13 \\ -4 & -13 & -7 \end{bmatrix}$

B. (1/25) $\begin{bmatrix} -13 & -11 & -4 \\ -11 & -17 & -13 \\ -4 & -13 & -7 \end{bmatrix}$ D. (13/25) $\begin{bmatrix} -13 & -11 & -4 \\ -11 & -17 & -13 \\ -4 & -13 & -7 \end{bmatrix}$

36. Find the moment of inertia with respect to the x – axis of the area bounded by the parabola $y^2 = 4x$ and the line x = 1.

A. 2.03 C. 2.13
B. 2.33 D. 2.83

37. Carmela gives ¼ of her cookies to Charlie. In turn Charlie gave 1/5 of what he received to Dennis. If Dennis received 2, how many candies have Carmela?
    A. 50 C. 30
    B. 20 D. 40

38. 120 is 20% of what number?
    A. 240 C. 60
    B. 480 D. 600

39. What is the line curve of r = 6?
    A. Line C. Circle
    B. Parabola D. Ellipse

40. Jose is 5' 11" in height while Pedro 6' 5" in height. Pedro is _____ taller than Jose.
    A. 8" C. 1' 6"
    B. 6" D. 1' 3"

41. What conic section, $B^2 - 4AC = 0$?
    A. Circle C. Parabola
    B. Ellipse D. Hyperbola

42. The sides of a right triangle are in arithmetic progression. The sides of a triangle are
    A. 2, 4, and 6 C. 3, 4, and 5
    B. 4, 6 and 8 D. 5, 7, and 9

43. What is the biggest area of rectangle that can be inscribed in an ellipse with an equation of $4x^2 + 2y^2 = 4$?
    A. $4\sqrt{2}$ C. $2\sqrt{2}$
    B. 2 D. $3\sqrt{2}$

44. What is the equation tangent to the curve $x^2 + y^2 = 5$ at (2, 1)?
    A. 2x + y = 25 C. 2x + y = 5
    B. x – 2y = 0 D. x + 2y = 5

45. What is the equation normal to the curve $x^2 + y^2 = 25$ thru (2, 1)?
    A. 2x + y = 25 C. 2x + y = 5
    B. X – 2y = 0 D. x + 2y = 5

46. A 3 – 4 – 5 triangle is inscribed in a circle. Find the diameter of the smallest circle that can circumscribe it.
    A. 6 C. 8
    B. 5 D. 10

47. Find the limit of $(x^2 – 4)/(x – 2)$ as x approaches infinity.

A. 2 C. 0
B. 4 D. indeterminate

48. 14.5 is 29% of what number?

A. 51.667 C. 4.205
B. 48.333 D. 50.0

49. Bobby is two years as twice as old as Ellen. The sum of two times the age of Bobby and three times the age of Ellen is 66. How old is Bobby?

A. 10 C. 18
B. 12 D. 15

50. Fin the ratio of the angles of a triangle if the product of their sines is maximum.

A. 1:1:1 C. 1:1:2
B. 1:2:2 D. 1:2:3

51. Evaluate cos3x if sinx = 2

A. 4 C. 6
B. – 3 D. – 7

52. The genes run in a certain family such that one in every triplets is going to give birth to another triplets, given 11 generations before them, how may triplet ancestors they have?

A. 4,094 C. 4,095
B. 4,498 D. 4,925

53. A certain vector U = 7j and vector V with length of 5 units rotates freely in the xy – plane. What is the maximum value of |U x V|?

A. |U x V| = 7 C. |U x V| = 35
B. |U x V| = 5 D. |U x V| = 12

54. Find the sum of the first five terms of the geometric progression if the third term is 144 and the sixth term is 456.

A. 8644 C. 844
B. 1044 D. 8044

55. The sides of a right triangle are in arithmetic progression. The sides of the triangle are:

A. 3, 4, 5 C. 2, 3, 4
B. 1, 2, 3 D. 4, 5, 6

56. Re $(1 – i)^{(1+i)}$

A. 0.645 C. 3.102
B. 1.551 D. 2.808

57. If $\cos\theta < 0$ and $\tan\theta > 0$, then in what quadrant is $P(\theta)$ located?
    A. I
    C. II
    B. III
    D. IV

58. A and B can a job in 5 hrs, B and C can do it in 4 hrs. while A and C can do it 2.5 hrs. How long will it take for the three (A, B, and C) working together to finish the job?
    A. 2.28 hrs
    C. 2.35 hrs
    B. 2.45 hrs
    D. 2.73 hrs

59. Evaluate $\csc 520°$
    A. 0.5
    C. 2.924
    B. – 1.064
    D. 1.003

60. Find the sum of the first five terms of the geometric progression of the third term is 144 and the sixth term is 456.
    A. 8644
    C. 844
    B. 1044
    D. 8044

61. What is the simplest form of $2i\ (-36) + 4i\ (-4)$.
    A. 20
    C. – 20
    B. 20i
    D. – 20i

62. A trough is made by bending the two sides of a piece of tin 60 cm wide. Find the width of the base if its carrying capacity is a maximum.
    A. 30 cm
    C. 20 cm
    B. 15 cm
    D. 12 cm

63. How many ways can 3 dogs be selected in a pack of 7 dogs?
    A. 35
    C. 70
    B. 21
    D. 27

64. Three circles externally tangent with each other has radii 3 cm, 4 cm, and 5 cm. Find the maximum angle formed by the triangle connecting the centers of the circle.
    A. 90°
    C. 83.6°
    B. 60°
    D. 73.4°

65. Find the equation of the line 3 units from origin and parallel to $3x - 4y + 5 = 0$
    A. $3x - 4y + 15 = 0$
    C. $3x - 4y - 8 = 0$
    B. $3x - 4y + 5 = 0$
    D. $3x - 4y + 8 = 0$

66. Find the area between $x^2 - 4x + y - 4 = 0$ and $3x^2 - 12x + 2y - 8 = 0$
    A. 40/3
    C. 16/3
    B. 54/3
    D. 32/3

67. Find the weight of the heaviest right circular cylinder that can be cut from a 100 kg solid iron shot.

A. 50 kg
C. 75 kg
B. 86.6 kg
D. 57.7 kg

68. Evaluate sin(A + B); sin A = -3/5 quad 4; cot B = 4 quad 3.

A. $9/5\sqrt{2}$
C. $-16/5\sqrt{17}$
B. $16/5\sqrt{17}$
D. $-8/5\sqrt{17}$

69. What fraction is the volume of the largest right circular cone that can be inscribed in a sphere.

A. 2/9
C. 8/27
B. $\sqrt{3}/3$
D. 1/3

70. A pendulum 1m long oscillates at an angle of 10°. Find the length of the arc subtended.

A. pi/8
C. pi/18
B. pi/9
D. 1/3

71. The equation |z +5| + |z + 5| = 5 represents what kind of a curve?

A. Circle
C. Parabola
B. Ellipse
D. Hyperbola

72. Find the relation of height and base radius of a right circular cylinder of minimum surface area when volume is given.

A. R = H
C. R = 2H
B. R = 3H
D. R = H/2

73. A circle with center at the origin has a radius of 5. Find the equation of a parabola opening to the right that has its vertex on the circle and crossing the points of intersection of the circle and y – axis.

A. $5x + 25 = y^2$
C. $5y + 55 = x^2$
B. $5x – 25 = y^2$
D. $5y – 25 = x^2$

74. A parabola opening to the right has its vertex on the circle and crosses the circle thru the diameter. If the center of the circle is at the origin, find the coordinates of the focus of parabola.

A. (0, 1/3)
C. (0,– 1/3)
B. (0, 3/4)
D. (0, – 3/4)

75. The area enclosed by r – a(1 – cosθ).

A. $1.5\pi a^2$
C. $2\pi a^2$
B. $\pi a^{2/2}$
D. πa^2

76. Evaluate the double integral of dx dy/(x – y) with the outer limit 2y to 3y and inner limit 0 – 2.

A. ln2 C. ln3
B. ln1/2 D. ln4

77. What is the equation of the circle that passes thru the vertex and latus rectum of the curve $y^2 = 8x$?

A. $(x – 4)^2 + y^2 = 20$ C. $(x – 2)^2 + y^2 = 16$
B. $(x – 5)^2 + y^2 = 25$ D. $(x – 3)^2 + y^2 = 17$

78. What is the equation of the tangent line of the circle $x^2 + y^2 = 5$ thru (1, 2)

A. x + 2y – 5 = 0 C. 3x – 4y + 5 = 0
B. 5x – 8y + 11 = 0 D. 2x – 3y + 4 = 0

79. Given the tangent lines, x + 2y – 5 = 0 at (3, 1) and 2x – y – 10 = 0 at (4, - 2) of a circle. Find the equation of the circle.

A. $(x – 4)^2 + (y – 1)^2 = 1$ C. $(x + 1)^2 + (y + 2)^2 = 25$
B. $(x – 2)^2 + (y + 1)^2 = 5$ D. $(x – 11)^2 + (y – 2)^2 = 65$

80. The distance of a point from a pole is called _____.

A. abcissa C. x - intercept
B. y - intercept D. radius vector

81. If 20 workers can fabricate 40 transistors in 8 hours, how many workers can fabricate 960 transistors in a week?

A. 80 C. 100
B. 90 D. 140

82. Evaluate $\int_0^{\pi/2} \left(\sin^5 x + \cos^3 x\right) dx$

A. 2.3873 C. 68.755
B. 1.5702 D. 1.2

83. Angle subtended in mils by a line 10 yards and a distance of 5000 yards.

A. 2.5 C. 4
B. 0.4 D. 3.6

84. What kind of curve is $4x^2 – 6y^2 + 5y + 6x + 5 = 0$

A. Circle C. Parabola
B. Ellipse D. Hyperbola

85. Water is pouring into a conical vessel 10cm deep and having a radius of 5 cm across the top. If the rate at which the water rises is 50 cm^3/sec, how fast is the water flowing into the vessel when the water is 6cm deep?

A. 2.38 C. 1.77
B. 3.73 D. 4.57

86. What conic section, $B^2 - 4AC = 0$?
A. Circle C. Parabola
B. Ellipse D. Hyperbola

87. A boat travelling Eastward N45°E after travelling 5kms its angle is N67°W. Find the distance of the lighthouse from both points?
A. 3.87 km C. 8.32 km
B. 0.87 km D. 8 km

88. Inverse Laplace transform of $1/(s + b)^2$
A. tsinbt C. t^2sinbt
B. $t\ e^{-bt}$ D. $t^2\ e^{-bt}$

89. The Laplace transform of $\frac{t}{2b} tsinbt$
A. $s/s^2 - b^2$ C. $s/(s^2 + b^2)^2$
B. $1/s^2 - b^2$ D. $1/(s^2 - b^2)^2$

90. Find the general solution of dy/dx = secx.
A. xy = Csecx tanx C. xy = C(secx – tanx)
B. xy = C(secx + tanx) D. xy = C($secx^2$ tanx)

91. What is the centroid of a semi – circular arc of radius R?
A. 2R/π C. 4R/3π
B. 4R/π D.3R/8

92. The distance of a point from x – axis is called _____.
C. abcissa C. x - intercept
D. y - intercept D. ordinate

93. What is the domain if f(x) = 3x, – 6 <=x<=8.
A. (– 6, 8) C. (6, 8)
B. (–18, 24) D. (–6, –8)

94. What is the centroid of a semi – circular area of radius R?
A. 2R/ π C. 4R/3π
B. 4R/ π D. 3R/8

95. What is the centroid of a hemisphere of radius R?
A. 2R/ π C. 4R/3π
B. 4R/ π D. 3R/8

96. A prehistoric wood contains Carbon 14 which is about ¼ on the present day wood from the same tree. How many years old is the prehistoric wood?

A. 11,200 C. 11,300
B. 11,400 D. 11,500

97. What is the arc length of $4y = x^2$ from y = 0 to y = 4.

A. 11.832 C. 5.916
B. 6.586 D. 2.958

98. For a given function, it is found that f(t) – f(– t). What type of symmetry does f(t) have?

A. Odd symmetry C. even symmetry
B. Rotational symmetry D. quarter – wave symmetry

99. Find the family of parabola with vertex at the origin and focus at the x – axis.

A. $Cy = x^2$ C. $Cx = y^2$
B. $y = x^2 + C$ D. $x = y^2 + C$

100. The integral of a function between certain limits divided by the difference in abscissas between those limits gives the _____ of the function.

A. Average C. middle
B. Intercept D. asymptote

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