PRACTICE QUESTIONS- SET-1

Content Domain	Approximate Percentage of Test	Approximate Number of Questions
I. Number and Quantity	16%	16
II. Algebra	25%	25
III. Geometry and Measurement	23%	23
IV. Probability and Statistics	16%	16
V. Trigonometry, Calculus, and Discrete	20%	20

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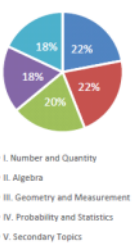
Content Domain	Approximate Percentage of Test	Approximate Number of Questions
I. Number and Quantity	22%	22
II. Algebra	22%	22
III. Geometry and Measurement	20%	20
IV. Probability and Statistics	18%	18
V. Secondary Topics	18%	18



1. Two dice are tossed. What is the probability that the sum of the two dice is greater than 3?

A) 1/4

B) 3/4

C) 5/6

D) 11/12

E) 1

2. If L is a line through the points (2,5) and (4,6), what is the value of k so that the point of coordinates (7,k) is on the line L?

A) 0

B) 5

C) 6

D) 15/2

E) 11

3. Find a negative value of k so that the graph of $y = x^2 - 2x + 7$ and the graph of $y = kx + 5$ are tangent?

A) $-4\sqrt{2}$

B) $-2 - 2\sqrt{2}$

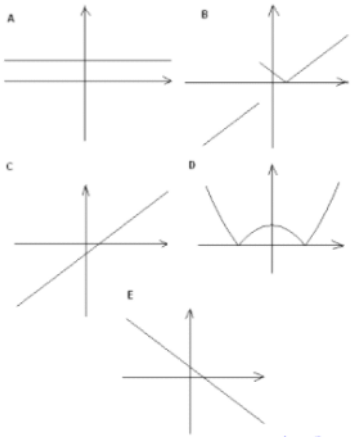
C) -2

D) $-\sqrt{2}$

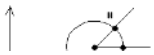
E) $-2 + \sqrt{2}$

4. Which of these graphs is the closest to the graph of

$$f(x) = |4 - x^2| / (x + 2)?$$



5. The circle of equation $(x - 3)^2 + (y - 2)^2 = 1$ has center c. Point M(4,2) is on the circle. N is another point on the circle so that angle McN has a size of 30°. Find the coordinates of point N.



11. The domain of $f(x) = \sqrt{(4 - x^2)} / \sqrt{(x^2 - 1)}$ is given by the interval

A) (-2 , 2)

B) (-1 , 2)

C) (-2 , -1) U (1 , 2)

D) (-2 , 2) U (-1 , 1)

E) [-2 , -1) U (1 , 2]

12. The area of the circle $x^2 + y^2 - 8y - 48 = 0$ is

A) 96Pi

B) 64Pi

C) 48Pi

D) 20Pi

E) Pi

13. The y coordinates of all the points of intersection of the parabola $y^2 = x + 2$ and the circle $x^2 + y^2 = 4$ are given by

A) 2 , -2

B) 0

C) 0 , $\sqrt{3}$, $-\sqrt{3}$

D) 1 , 2 , -1

E) 1 , -2 , 1

14. What is the smallest positive zero of function $f(x) = 1/2 - \sin(3x + Pi/3)$?

A) Pi

B) Pi/3

C) Pi/6

D) Pi/18

E) Pi/36

15. If x - 1, x - 3 and x + 1 are all factors of a polynomial P(x) of degree 3, which of the following must also be a factor of P(x)?

I) $x^2 + 1$

II) $x^2 - 1$

III) $x^2 - 4x + 3$

A) II and III only

B) I and II only

C) III only

D) II only

E) I only

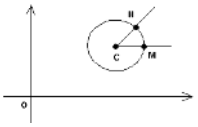
16. A cylinder of radius 5 cm is inserted within a cylinder of radius 10 cm. The two cylinders have the same height of 20 cm. What is the volume of the region between the two cylinders?

A) 1000

B) 500Pi

C) 1000Pi

D) 1500Pi



A) (3 + √3/2 , 5/2)

B) (5/2 , 3 + √3/2)

C) (3 - √3/2 , 3/2)

D) (3/2 , 3 - √3/2)

E) (4 , 3)

6. Vectors **u** and **v** are given by **u** = (2 , 0) and **v** = (-3 , 1). What is the length of vector **w** given by **w** = -**u** - 2**v**?

A) 10

B) 6

C) √26

D) 2√5

E) 2

7. What is the smallest distance between the point(-2,-2) and a point on the circumference of the circle given by

$$(x - 1)^2 + (y - 2)^2 = 4?$$

A) 3

B) 4

C) 5

D) 6

E) 7

8. What is the equation of the horizontal asymptote of function

$$f(x) = 2/(x + 2) - (x + 3)/(x + 4)?$$

A) - 4

B) - 2

C) - 1

D) 0

E) 1

9. The lines with equations x + 3y = 2 and -2x + ky = 5 are perpendicular for k =

A) -3

B) -2

C) -1

D) 0

E) 2/3

10. If $f(x) = (x - 1)^2$ and g(x) = √x, then $(g \circ f)(x)$ =

A) |x - 1|

B) x - 1

C) 1 - x

D) $\sqrt{x}(x - 1)^2$

E) $(\sqrt{x} - 1)^2$

22. If in a triangle ABC, sin(A) = 1/5, cos(B) = 2/7, then cos(C) =

A) (√45 - 2√24)/35

B) (√45 + 2√24)/35

C) (7√24 + 10)/35

D) 0.85

E) 1

23. Find the sum $\sum_{k=1}^{100} (3 + k)$

A) 300

B) 5050

C) 5300

D) 5350

E) 5400

24. What value of x makes the three terms x, x/(x + 1) and 3 x/[(x + 1)(x + 2)] those of a geometric sequence?

B) 500Pi

C) 1000Pi

D) 1500Pi

E) 2000Pi

17. A data set has a standard deviation equal to 1. If each data value in the data set is multiplied by 4, then the value of the standard deviation of the new data set is equal to

A) 0.25

B) 0.50

C) 1

D) 2

E) 4

18. A cone made of cardboard has a vertical height of 8 cm and a radius of 6 cm. If this cone is cut along the slanted height to make a sector, what is the central angle, in degrees, of the sector?

A) 216

B) 180

C) 90

D) 36

E) 1.2

19. If sin(x) = -1/3 and Pi ≤ x ≤ 3Pi/2, then cot(2x) =

A) 8

B) 4√2

C) 2√2

D) √2

E) 7/(4√2)

20. Which of the following functions satisfy the condition $f(x) = f^{-1}(x)$?

I) f(x) = -x

II) f(x) = √x

III) f(x) = -1/x

A) III and II only

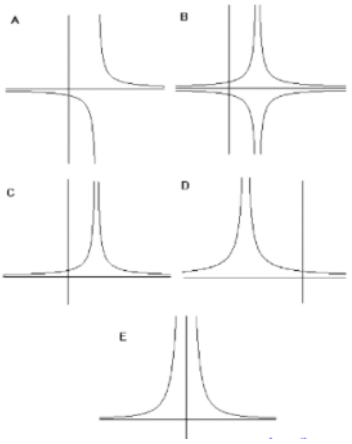
B) III and I only

C) III only

D) II only

E) I only

21. If f(x) = 1 / (x - 2), which of the following graphs is closest to the graph of |f(x)|



25. As x increases from Pi/4 to 3 Pi/4, |sin(2x)|

26. If $ax^3 + bx^2 + c x + d$ is divided by x - 2, then the remainder is equal

E) 5400

24. What value of x makes the three terms x, x/(x + 1) and 3 x/[(x + 1)(x + 2)] those of a geometric sequence?

A) 2
B) 1
C) 1/2
D) 1/4
E) -1/2

25. As x increases from Pi/4 to 3 Pi/4, |sin(2x)|

A) always increases
B) always decreases
C) increases then decreases
D) decreases then increases
E) stay constant

26. If $ax^3 + bx^2 + c\,x + d$ is divided by x - 2, then the remainder is equal

A) d
B) a - b + c - d
C) 8a + 4b + 2c + d
D) -8a + 4b -2c + d
E) a + b + c + d

27. A committee of 6 teachers is to be formed from 5 male teachers and 8 female teachers. If the committee is selected at random, what is the probability that it has an equal number of male and female teachers?

A) 1/10
B) 140/429
C) 150/429
D) 160/429
E) 170/429

28. The range of the function f(x) = -|x - 2| - 3 is

A) $y \geq 2$
B) $y \leq -3$
C) $y \geq -3$
D) $y \leq -2$
E) $y \geq -2$

29. What is the period of the function $f(x) = 3 \sin^2(2x + Pi/4)$?

A) 4Pi
B) 3Pi
C) Pi
D) Pi/2
E) Pi/3

30. It is known that 3 out of 10 television sets are defective. If 2 television sets are selected at random from the 10, what is the probability that 1 of them is defective?

A) 7/15
B) 1/10
C) 1/2
D) 1/3
E) 1

31. In a triangle ABC, angle B has a size of 50°, angle A has a size of 32° and the length of side BC is 150 units. The length of side AB is

A) 232
B) 250
C) 260
D) 270
E) 280

32. For the remainder of the division of $x^3 - 2x^2 + 3kx + 18$ by x - 6 to be equal to zero, k must be equal to

A) 0
B) 1
C) 5
D) -9
E) -10

33. It takes pump (A) 4 hours to empty a swimming pool. It takes pump (B) 6 hours to empty the same swimming pool. If the two pumps are started together, at what time will the two pumps have emptied 50% of the water in the swimming pool?

A) 1 hour 12 minutes
B) 1 hour 20 minutes
C) 2 hours 30 minutes
D) 3 hours
E) 5 hours

34. The graph of r = 10 cos(Θ) , where r and Θ are the polar coordinates, is

A) a circle
B) an ellipse
C) a horizontal line
D) a hyperbola
E) a vertical line

35. If (2 - i)*(a - bi) = 2 + 9i, where i is the imaginary unit and a and b are real numbers, then a equals

A) 3
B) 2
C) 1
D) 0
E) -1

36. Lines L1 and L2 are perpendicular that intersect at the point (2 , 3). If L1 passes through the point (0 , 2), then line L2 must pass through the point

A) (0 , 3)
B) (1 , 1)
C) (3 , 1)
D) (5 , 0)
E) (6 , 7)

37. A square pyramid is inscribed in a cube of total surface area of 24 square cm such that the base of the pyramid is the same as the base of the cube. What is the volume of the pyramid?

A) 1/3
B) 8/3
C) 6
D) 4
E) 8

38. The graph defined by the parametric equations

$x = \cos^2 t$
$y = 3 \sin t - 1$
is

A) a circle
B) a hyperbola
C) a vertical line
D) part of a parabola
E) an ellipse

39.

$$\lim_{x \to 2} \frac{(x^4 - 16)}{x - 2} =$$

A) 33
B) 32
C) 30
D) 1
E) 0

40. For x > 0 and x not equal to 1, $\log_{16}(x)$ =

A) $8 \log_2(x)$
B) $4 \log_2(x)$
C) $0.5 \log_2(x)$
D) $0.25 \log_2(x)$
E) $0.125 \log_2(x)$

41. The value of k that makes function f, defined below, continous is

$$f(x) = \begin{cases} \dfrac{2x^2 + 5x}{x}, & when\ x \neq 0 \\ 3k - 1, & when\ x = 0 \end{cases}$$

A) 1/3
B) 1
C) 2
D) 5
E) 6

42. If $\log_b(a) = x$ and $\log_b(c) = y$, and 4 x + 6 y = 8, then $\log_b(a^2 c^2)$

A) 0
B) 1
C) 2
D) 3
E) 4

43. The point (0 , -2 , 5) lies on the

A) z axis
B) x axis
C) xy plane
D) yz plane
E) xz plane

44. Curve C is defined by the equation $y = \sqrt{(9 - x^2)}$ with $x \geq 0$. The area bounded by curve C, the x axis and the y axis is

A) Pi/4
B) 9Pi/4
C) 9Pi/2
D) 9Pi
E) (81/4)Pi

45. In a plane there are 6 points such that no three points are collinear. How many triangles do these points determine?

A) 2
B) 3
C) 6
D) 18
E) 20

46.

$$\begin{bmatrix} 3 & 2 \\ -1 & -2 \\ 4 & 5 \end{bmatrix} \begin{bmatrix} 0 & a \\ b & c \end{bmatrix} = \begin{bmatrix} -4 & 9 \\ 4 & -7 \\ -10 & 19 \end{bmatrix}$$

Find a, b and c.

A) 2 , -1 , 3
B) 1 , -2 , 3

47. If the sum of the repeating decimals 0.353535... + 0.252525... is written as a fraction in lowest terms, the product of the numerator and denominator is

A) 3465
B) 2475
C) 680
D) 670
E) 660

D) 18

E) 20

Find a, b and c.

A) 2 , -1 , 3

B) 1 , -2 , 3

C) 3 , -2 , 1

D) 1 , 2 , 3

E) 1 , 2 , -3

D) 670

E) 660

48. $\sin(\tan^{-1}\sqrt{2}) =$

A) 0.82

B) 0.83

C) 0.84

D) 0.85

E) 0.86

49. If $8^x = 2$ and $3^{x+y} = 81$, then y =

A) 1/3

B) 9/3

C) 11/3

D) 13/3

E) 4

50. Let $f(x) = -x^2 / 2$. If the graph of f(x) is translated 2 units up and 3 units left and the resulting graph is that of g(x), then g(1/2) =

A) 0

B) -1/8

C) -2/8

D) -33/8

E) 13/8