MATHS

BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

EXAMINATION QUESTION PAPER MARCH 2019

Mathematics

1. The value of x, for which the matrix A = $\begin{bmatrix} e^{x-2} & e^{7+x} \\ e^{2+x} & e^{2x+3} \end{bmatrix}$ is singular is

A. 7

B. 6

C. 9

D. 8

Answer:

> ▶ **Watch Video Solution**

---

2. The nth term of the sequence 2, 7, 14, 23, ...is:

A. $n^2 + 2n + 1$

B. $n^2 + 2n - 1$

C. $n^2 - 2n - 1$

D. $n^2 - 2n + 1$

Answer:

3. $\int \dfrac{\sec x}{\sqrt{\cos 2x}} dx$ is

A. $\tan^{-1}(\cos x) + c$

B. $\sin^{-1}(\tan x) + c$

C. $\tan^{-1}(\sin x) + c$

D. $2\sin^{-1}(\tan x) + c$

Answer:

4. The line $\dfrac{x}{a} - \dfrac{y}{b} = 0$ has the slope 1,if:

A. $a = b$

B. only for $a = 1, b = 1$

C. $a > b$

D. $a < b$

Answer:

5. The number of 5 digit numbers all digits of which are odd is

    A. 4×5^4

    B. 4×5^5

    C. 5^5

    D. 5×5

Answer:

▶ Watch Video Solution

6. If $f(x) = \begin{cases} 2a - x, & \text{for} \quad -a < x < a \\ 3x - 2a, & \text{for} \quad x \geq a \end{cases}$ then

which of the following is true?

A. f (x) is continuous for all x in R

B. f (x) is differentiable for all $x \geq a$

C. $f(x)$ is not differentiable at $x = a$

D. f (x) is iscontinous at $x = a$

Answer:

7. A number is selected from the set $\{1, 2, 3, . . , 20\}$. The probability That the selected number is divisible by 3 or 4 is

A. $\dfrac{1}{2}$

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

C. $\dfrac{2}{5}$

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

Answer:

8. Which of the following is not a periodic function with period 2π?

    A. $\tan x$

    B. $\cos x$

    C. $\sin x$

    D. $\cos ecx$

Answer:

▶ **Watch Video Solution**

9. Straight line joining the points (2,3) and (-1,4) passes through the point (α, β) if

    A. $\alpha + 3\beta = 11$

    B. $3\alpha + \beta = 11$

    C. $\alpha + 2\beta = 7$

    D. $3\alpha + \beta = 9$

Answer:

▶ Watch Video Solution

10. The minimum and the maximum values of $|\cos x| - 2$ are respectively ....

    A. 0 and 2

    B. -2 and 0

    C. -2 and -1

    D. -1 and 1

Answer:

▶ Watch Video Solution

11. If $f(x) = x^2 - 3x$, then the points at which $f(x) = f'(x)$ are

    A. both irrational

    B. one rational and another irational

    C. both positive integers

    D. both negative intergers

Answer:

12. The unit vector parallel to the resultant of the vectors $\hat{i} + \hat{j} - \hat{k}$ and $\hat{i} - 2\hat{j} + \hat{k}$ is

A. $\dfrac{2\hat{i} - \hat{j} + \hat{k}}{\sqrt{5}}$

B. $\dfrac{2\hat{i} - \hat{j}}{\sqrt{5}}$

C. $\dfrac{\hat{i} - \hat{j} + \hat{k}}{\sqrt{5}}$

D. $\dfrac{2\hat{i} + \hat{j}}{\sqrt{5}}$

Answer:

▶ **Watch Video Solution**

13. It is given that the events A and B are such that $P(A) = \dfrac{1}{4}$, $P(A/B) = \dfrac{1}{2}$ and $P(B/A) = \dfrac{2}{3}$.

Then P(B) is

A. $\dfrac{2}{3}$

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

C. $\dfrac{1}{6}$

D. $\dfrac{1}{3}$

Answer:

▶ Watch Video Solution

14. If $\vec{a}$, $\vec{b}$ are the position vectors A and B then which one of the following points whose position vector lies on AB, is

A. $\dfrac{2\vec{a} + \vec{b}}{2}$

B. $\dfrac{\vec{a} - \vec{b}}{3}$

C. $\vec{a} + \vec{b}$

D. $\dfrac{2\vec{a} - \vec{b}}{2}$

Answer:

▶ **Watch Video Solution**

15. If $|x + 2| \leq 8,$ then x belongs to ....

A. $(6, 10)$

B. $(-10, 6)$

C. $[6, 10]$

D. $[-16, 6]$

Answer:

▶ **Watch Video Solution**

16. The expansion of $(1 - x)^{-2}$ is?

A. $1 - x + x^{2} - \ldots$

B. $1 + x + x^{2} + \ldots$

C. $1 - 2x + 3x^{2} - \ldots$

D. $1 + 2x + 3x^{2} + \ldots$

Answer:

▶ **Watch Video Solution**

17. If $f : R \to R$ is defined by $f(x) = |x| - 5,$ then the range of f is ....

A. $(-\infty, -5)$

B. $(-\infty, 5)$

C. $[-5, \infty)$

D. $(-5, \infty)$

Answer:

---

18. Which one of the following is true about the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 5 \end{bmatrix}$?

A. an upper trangular matrix

B. a lower triangular matrix

C. a scalar matrix

D. a diagonal matrix

Answer:

▶ **Watch Video Solution**

---

19. Write the value of

Horizontal component .

▶ **Watch Video Solution**

20. Write the relationship between Permutation and Combination?

> ▶ **Watch Video Solution**

21. Count the number of positive integers greater than 6000 and less than 7000 which are divisible by 5, provided that no digits are repeated?

> ▶ **Watch Video Solution**

22. Find the separated equations from a combined equation of a straight line $2x^2 + xy - 3y^2 = 0$

23. Define diagonal and scalar matrices?

24. Find a unit vector along the direction of the vector

$$5\hat{i} - 3\hat{j} + 4\hat{k}$$

25. Define a continuous function on the closed interval [a,b]

26. Consider the function $f(x) = \sqrt{x}, x \geq 0$. Does $\lim_{x \to 0} f(x)$ exist ?

27. An integer is chosen at random from the first ten positive integers.Find the probability that it is a multiple of three?

28. It is correct to say $A \times A = \{(a, a) : a \in A\}$?

Justify your answer.

29. A football player can kick a fotball from ground level with an initial velocity (u) of 80 ft/second. Find the maximum horixzontal distance the football travels and at what angle

(Take $R = \dfrac{u^2 \sin 2\alpha}{g}$, and $g = 32$)

30. Find the coefficient of x^3 in the expansion of $(2 - 3x)^7$.

31. Find the nearest point on the line $x - 2y = 5$ from the origin.

32. If $\vec{a}, \vec{b}, \vec{c}$ are three vectors such that $\vec{a} + 2\vec{b} + \vec{c} = \vec{0}$, and $\left|\vec{a}\right| = 3, \left|\vec{b}\right| = 4, \left|\vec{c}\right| = 7$, find the angle between $\vec{a}$ and $\vec{b}$.

33. Examine the continuity of the following :

$\cot x + \tan x$

34. Differentiate the following :

$y = \sin^{-1}\left(\dfrac{1 - x^2}{1 + x^2}\right)$

35. Find $\dfrac{dy}{dx}$ if $x = a(t - \sin t), y = a(1 - \cos t)$

36. Evaluate: $\int (x-3)\sqrt{x+2}dx.$

37. Construct a suitable domain X such that $f: x \rightarrow N$ defined by $f(n) = n + 3$ to be one ot one and onto.

38. For the given bases curve $y = \sin x$, draw $y = \dfrac{1}{2}\sin 2x$

▶ View Text Solution

39. Solve the equation $\sqrt{6 - 4x - x^2}$ = x + 4

▶ Watch Video Solution

40. State and prove any one of the Napier's formulae.

▶ View Text Solution

41. Do the limit of the function $\dfrac{\sin(x - [x])}{x - [x]}$ exist as $x \to 0$? State the resons for your answer.

42. Prove that for any natural number n, $a^n - b^n$ is divisible by a-b, where $a > b$.

43. Evaluate, $\displaystyle\int \dfrac{2x + 4}{x^2 + 4x + 6}$

44. Prove that $\sqrt[3]{x^3 + 7} - \sqrt[3]{x^3 + 4}$ is approximately equal to $\dfrac{1}{x^2}$ when x is large.

▶ **Watch Video Solution**

45. Find the unit vectors perpendicular to each of the vectors $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$,where $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} + 3\hat{k}.$

▶ **Watch Video Solution**

46. Find $\dfrac{d^2 y}{dx^2}$ if $x^2 + y^2 = 4$

▶ **Watch Video Solution**

47. The chances of X, Y and Z becoming managers of a certain company are 4 : 2 : 3. The probabilities that bonus scheme will be introduced if X, Y and Z become managers are 0.3, 0.5 and 0.4 respectively. If the bonus scheme has been introduced, what is the probability that Z was appointed as the manager?

48. By using properties of determinants , show that :
$$\begin{bmatrix} x & x^2 & yz \\ y & y^2 & zx \\ z & z^2 & xy \end{bmatrix} = (x - y)(y - z)(z - x)(xy + yz + zx)$$

49. Evaluate: $\displaystyle\int \sqrt{x^2 + x + 1}\,dx$