1

If $F(X) = \cot X - m \csc X$ has a local maximum value at $X = \frac{\pi}{4}$ then the value of the constant m=........

- $\sqrt{2}$
- $-\sqrt{2}$
- -1

- **1**

2

If the point (1,3) is an inflection point of the curve of the function f.

where $f^{`}(x) = 4x^3 - kx^2$**, then the value of the constant k=...........**

- **6**
- **4**
- **12**
- **24**

3

If $F(x) = \ln (x^2+1)^2 + e^{\sin x}$ **, then** $F(0) \times F^{\backslash}(0)$ **= ....**

- **1**
- **Zero**
- **e**
- **1+e**

4

The slope of the tangent to the curve $x^y - y^x = 0$ at the point (1 , 1) that lies on it is.........

- **1**
- **-1**
- **Zero**
- **2**

5

If $\frac{dy}{dx} = \sqrt{ay}$ and $\frac{d^2y}{dx^2}$ =3 , then the value of the constant a=.........

- **6**
- **3**
- **4**
- **5**

6

If $f'(x) = \dfrac{1}{x^2+1}$ **and** $g(x) = \tan x$**,**

then $(f \circ g)'(x)$**=..........**

- **1**

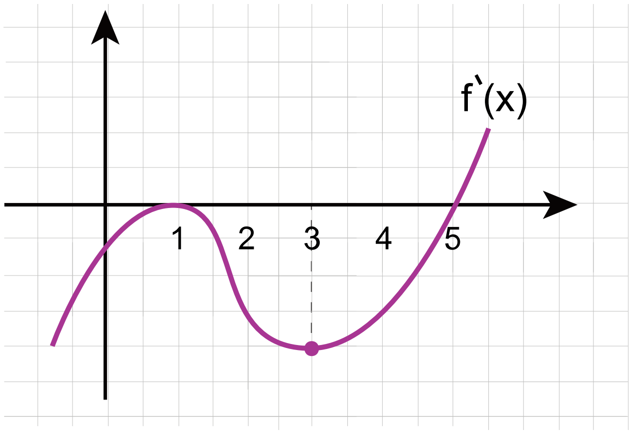
- $\sec^2 x$
- $\cos^2 x$
- $\sec^2 x \quad \tan^2 x$

7

The rate of change of the volume of sphere with respect to it's surface area when the length of its radius equals 2 cm is...........

- **1cm**
- 1cm^2
- $\frac{1}{2}\text{cm}$
- $\frac{1}{2}\text{cm}^2$

8



The opposite figure represents the curve of first derivative of $f(x)$**.**

then the statement which is must be true..........

(i) $f(4) < f(3)$

(ii) f has a local minimum value at $x = 5$

(iii) f has a local maximum value at $x = 1$

- **(i) and (ii)**
- **(ii) and (iii)**
- **(ii) only**
- **(iii) only**

9

If 1, ω , ω^2 are the cubic roots of the unity, then the expression $\frac{14 + 6\omega + 21\omega^2}{8\omega^2 - 7}$ = ……….

- - ω^2
- - ω
- ω
- ω^2

10

In the Argand's diagram:

The area of the circle which passes through the points which represent the cubic roots of unity = ……. Square unit.

- π
- 2π
- $\sqrt{3}\ \pi$
- $2\sqrt{3}\ \pi$

11

In the expansion of $(x + a)^n$ according to the descending powers of x, if T_4 is the fifteenth term from the end,

then n = …….

- 17
- 18
- 16
- 19

12

The value of the determinant $\begin{vmatrix} 2k & 2 & \frac{1}{3} \\ 6 & 3 & \frac{1}{k} \\ 3k & k & \frac{1}{2} \end{vmatrix}$ **where** $k \neq 0$ **equals ……….**

- zero
- $6k$
- $\frac{1}{6k}$
- $\frac{1}{6}k$

13

By how many ways a committee of 7 members can take an acceptance decision by majority?

- 64
- 99
- 5145
- 13440

14

The set of points in the space which satisfy the two equations:

$x^2 + y^2 + z^2 = 25$ and $Z = -4$ represents ……….

- A circle whose center is $(0\ ,\ 0\ ,\ -4)$ and its radius length is 3 unit length.
- A plane 4 unit length a way from the plane $x\ y$.
- A sphere whose center is the origin point and its radius length is 5 unit length.
- A sphere whose center is the origin point and its radius length is 4 unit length.

15

$(\hat{i} \times \hat{j}) . \hat{k} + \hat{i} . \hat{j} =$ ....where $\hat{i}$, $\hat{j}$ *and* $\hat{k}$ are the fundamental unit vectors.

- 1
- 0
- -1
- 2

16

If the plane whose equation: $6x + 3y + 4z - 72 = 0$ intersects the coordinate axes x , y and z at the points A, B and C respectively, then the volume of the pyramid OABC = ……….. volume unit, where O is the origin point.

- 864
- 1728
- 5184
- 12