

TEST YOUR GRIP
CLASS 10+2

1(a). If $a * b = \frac{3ab}{5}$ find its identity element

(b) If A is a non singular matrix of order 3 and $|A| = 3$, find $|adjA|$.

(c) find derivative of $\sin^{-1}x + \cos^{-1}x$ w.r.t.x

(d) find $\int \frac{2x-1}{x^2-x+5} dx$

(e) find $\int_0^1 \frac{dx}{1+x^2}$

(f) find degree of $y'' + \sin y' = 0$.

(g) If θ is the angle between \vec{a} & \vec{b} .also $|\vec{a}\vec{b}| = |\vec{a} \times \vec{b}|$ find θ .

(i) Find the distance between two parallel planes $x+2y-z+5=0$ and $2x+4y-2z+7=0$

2 Prove that $R = \{ (x,y) : x-y \text{ is an integer} \}$ is an equivalence relation.

3. Prove that $\sin^{-1} \frac{5}{13} + \cos^{-1} \frac{3}{5} = \tan^{-1} \frac{63}{16}$.

4. Show that $(AB)' = B'A'$ when $A = \begin{bmatrix} 1 & 2 & -1 \\ 0 & 3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 4 \\ -3 & 1 \\ 0 & 4 \end{bmatrix}$.

5. Discuss the cont. $f(x) = \begin{cases} \frac{x-2}{|x-2|} & x \neq 2 \\ 0 & x = 2 \end{cases}$.

6. If $(\sin x)^y = (\sin y)^x$ find $\frac{dy}{dx}$.

7. Using diff. find the approximate value of $(15)^{\frac{1}{4}}$.

8. $\int \frac{x^2}{(x^2+1)(x^2+2)} dx.$

9. Evaluate as limit of sum $\int_0^2 (x^2+1) dx.$

10. Using integration, find the area of the region bdd by $(-1,1), (0,5)$ & $(3,2).$

11. solve $\frac{dy}{dx} = 1+x+y+xy$

12. solve $(1+y^2)dx = (\tan^{-1} y - x)dy$

13. If $\vec{a}, \vec{b}, \vec{c}$ are unit vectors s.t. $\vec{a} + \vec{b} + \vec{c} = \vec{0}$ then find the value of $\vec{a} \cdot \vec{b} + \vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a}.$

14. In a bolt factory, machines A, B & C manufacture resp. 25%, 35%, 40% of the total. Of their output 5%, 4%, & 2% are defective. A bolt is drawn at random is found to be defective, find the prob that it is a product of machines B ?

15. The sum of mean and variance of a binomial dist. for 6 trial is $10/3$. Find dist.

16. Solve by matrix method $\frac{1}{x} + \frac{1}{y} - \frac{1}{z} = 1, \frac{3}{x} + \frac{1}{y} - \frac{2}{z} = 3, \frac{1}{x} - \frac{1}{y} - \frac{1}{z} = -1.$

17. Show that the semi vertical angle of right circular cone of given surface area and maximum volume is $\sin^{-1}\left(\frac{1}{3}\right).$

18. Find the eqn of the st. line thro the pt $(1, -3, 2)$ and is perpendicular to the lines $\frac{x-1}{1} = \frac{y-2}{2} = \frac{z-3}{3}, \frac{x-3}{-3} = \frac{y-2}{2} = \frac{z-1}{5}.$

19. Solve graphically maximize $z = -3x + 4y$ subject to constraints;

$$x + 2y \leq 8, \quad 3x + 2y \leq 12, \quad x \geq 0, \quad y \geq 0$$

Goyals's Math