



MATHS

BOOKS - ACCURATE PUBLICATION

SAMPLE QUESTION PAPER-IX



1. The relation R in R defined as $R = \{(a, b) : a \leq b\}$, is reflexive

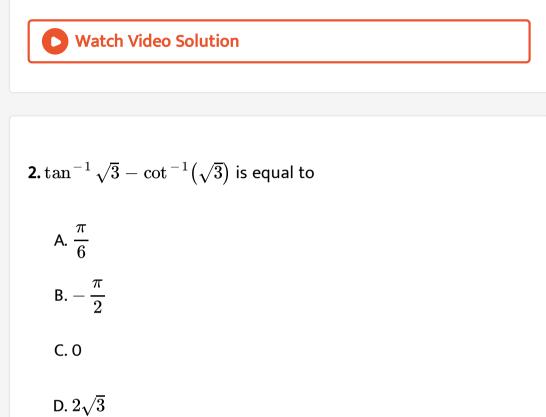
and transitive but not symmetric.

A. Reflexive and Symmetric

- B. Symmetric and Transitive
- C. Reflexive and Transitive

D. None of these

Answer: C



Answer: B



3. X, Z are matrices of order 2 imes n, 2 imes p respectively.

If n = p, then the order of the matrix 7X - 5Z is :

A. p imes 2B. 2 imes n

 $\mathsf{C}.\,n\times 3$

D. p imes n

Answer: B



4. Solution of
$$\begin{bmatrix} 2 & -3 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 \\ 3 \end{bmatrix}$$
 is given by
A. x = 2, y = 1

B. x = 1, y = 2

C. x = 2, y = 2

D. x = 2, y = 3

Answer: A

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5. If
$$A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$$
, then A + A' is
A. $\begin{pmatrix} 2 & 0 \\ 5 & 8 \end{pmatrix}$
B. $\begin{pmatrix} 2 & 5 \\ 5 & 8 \end{pmatrix}$
C. $\begin{pmatrix} 2 & 5 \\ 5 & 8 \end{pmatrix}$
D. $\begin{pmatrix} 1 & 5 \\ 5 & 4 \end{pmatrix}$

Answer: B

6. The constant k, so that the $f(x)= egin{cases} rac{x^2-2x-3}{x+1} & ext{if} \quad x
eq -1 \ k & ext{if} \quad x=-1 \end{cases}$

is continuous at x = -1 is

В. -2 С. -4

A. -1

D. -5

Answer: C

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7. Derivative of $\left(\sec^{-1}x + \csc^{-1}x
ight)$ w.r.t. x is

A. -1

B. 0

C. 1

D. 2

Answer: B



8. Differentiate
$$\tan^{-1}\left(\frac{\sin x}{1+\cos x}\right)$$
 w.r.t.x
A. $\frac{1}{3}$

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

C. $\frac{1}{4}$
D. $\frac{1}{5}$

Answer: B



9.
$$\int \frac{10x^9 + 10^x \log_e 10}{x^{10} + 10^x} \, dx$$
 is equal to :
A. $10^x - x^{10} + C$
B. $10^x + x^{10} + C$
C. $(10^x - x^{10})^{-1} + C$
D. $\log(10^x + x^{10}) + C$

Answer: D

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10. Evaluate the following integrals:

$$\int \!\! e^x igg(an^{-1}x + rac{1}{1+x^2} igg) dx$$

A. $e^x + c$

 $\mathsf{B}.\tan^{-1}x+c$

D.
$$e^x \tan^{-1} x + c$$

Answer: D



11. Find the particular solution of
$$\log \left(rac{dy}{dx}
ight) = 2x + 3y$$
 given that

$$x=0, y=0.$$

$$A. -\frac{1}{3}e^{-3y} = \frac{1}{2}e^{2x} - \frac{5}{6}$$
$$B. -\frac{1}{2}e^{-3y} = \frac{1}{3}e^{2x} - \frac{5}{6}$$
$$C. -\frac{1}{3}e^{-3y} = \frac{1}{4}e^{2x} - \frac{5}{6}$$
$$D. -\frac{1}{4}e^{-3y} = \frac{1}{3}e^{2x} - \frac{5}{6}$$

Answer: A



12. The general solution of the differential equation $rac{dy}{dx}=e^{x+y}$

is:

A.
$$e^x + e^{-y} = C$$

B. $e^x + e^y = C$
C. $e^{-x} + e^y = C$
D. $e^{-x} + e^{-y} = C$

Answer: A

13.

$$\overrightarrow{a} = \hat{i} - \hat{j} + 7 \hat{k} \, ext{ and } \, \overrightarrow{b} = 5 \hat{i} - \hat{j} + \lambda \hat{k}, ext{then} \, \overrightarrow{a} + \overrightarrow{b} \, ext{ and } \, \overrightarrow{a} - \overrightarrow{b}$$

are perpendicular vectors when λ is

A. $\lambda=\pm 2$ B. $\lambda=\pm 3$ C. $\lambda=\pm 4$

D. $\lambda=~\pm~5$

Answer: D

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14. Write the value of: $ig(\hat{i} \cdot ig(\hat{j} imes \hat{k}ig) + \hat{j}ig(\hat{i} imes \hat{k}ig) + \hat{k} \cdot ig(\hat{I} imes \hat{j}ig)$

lf

B. -1

C. 3

D. 0

Answer: C

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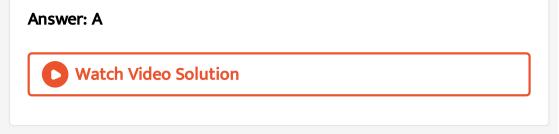
15. The length of the perpendicular drawn from the origin to the plane 2x - 3y + 6z + 21 = 0.

A. 3

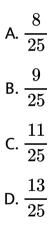
B. 4

C. 5

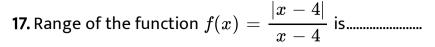
D. 2

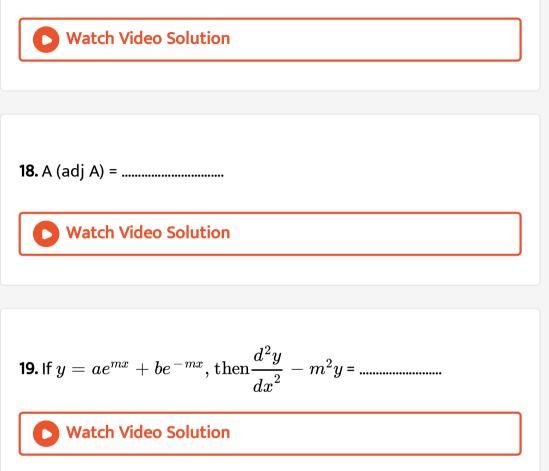


16. An urn contains 6 red and 4 blue balls. Two balls are drawn at random with replacement. The probability of getting 2 red balls is



Answer: B





20. The function f(x) = 7x - 3 is a strictly.....function on R.

21.
$$\int x^n \log x dx$$
 =

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22. I.F. of
$$x rac{dy}{dx} + y = x \log x$$
 is



23. A line makes angles of 45° and 60° with the positive axes of x and y respectively. The line makes an angle......with the positive axis of z.



24. The events E and F are given to be independent. If it is given

that P(E) = 0.35 and $P(E \cup F) = 0.60$, then P(F) =

25.
$$\cos^{-1} x = (\cos x)^{-1}$$

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26.
$$(ABC)^{-1} = C^{-1}B^{-1}A^{-1}$$

27.
$$rac{d}{dx}(x^x)=xig(x^{x\,-\,1}ig)$$



28.
$$prove: \int \frac{1}{(\log x)x} dx = \log(\log x) + c.$$

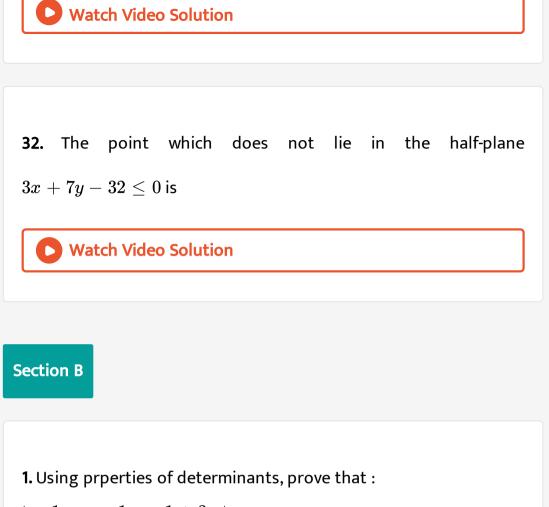
29. The vectors $\overrightarrow{a} = 3\hat{i} + x\hat{j}$ and $\overrightarrow{b} = 2\hat{i} + \hat{j} + y\hat{k}$ are mutually perpendicular. If $\left|\overrightarrow{a}\right| = \left|\overrightarrow{b}\right|$, then $y = \pm 2\sqrt{10}$.

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30. If a line makes angle $90^\circ, 135^\circ, 45^\circ$ with X,Y and Z-axis respectively, then its direction cosines are

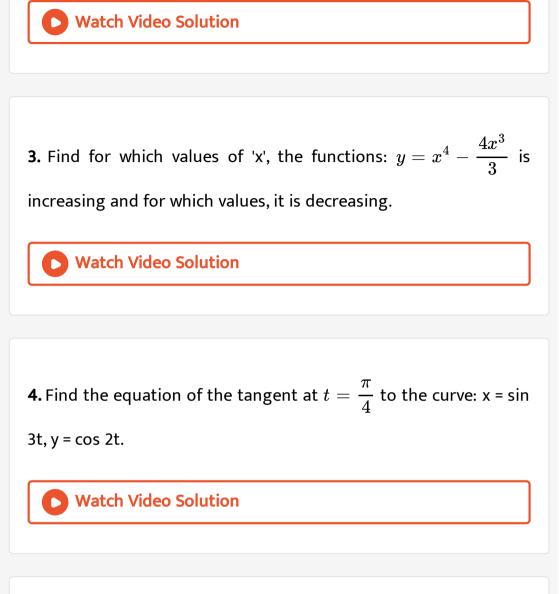
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31. One card is drawn from a well-shuffled pack of 52 cards. E is the event "the card drawn is a king or queen" and F is the event " the card drawn is a queen or an ace ". Then find the probability of the conditional event E/F .

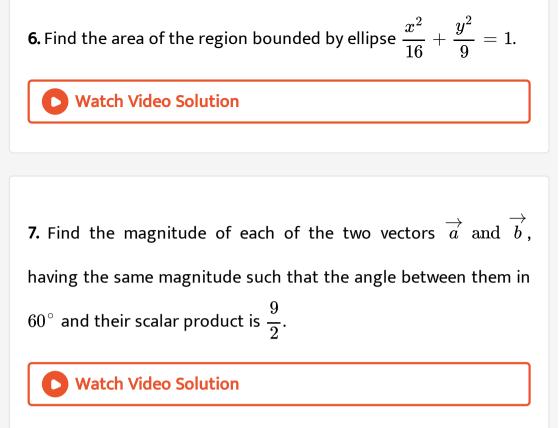


$$egin{array}{ccc|c} 1 & 1 & 1+3x \ 1+3y & 1 & 1 \ 1 & 1+3z & 1 \end{array} = 9(3xyz+xy+yz+zx).$$

2. If
$$\begin{bmatrix} 2x+y & 3y \\ 0 & 4 \end{bmatrix} = \begin{bmatrix} 6 & 0 \\ 6 & 4 \end{bmatrix}$$
 then find x



5. Find :
$$\int \sin^{-1}(2x) dx$$
.



8. Find the sine of the angle between the vectors $\overrightarrow{a}=2\hat{i}-\hat{j}+\hat{k}$ and $\overrightarrow{b}=3\hat{i}+4\hat{j}-\hat{k}$. Also find a unit vector

perpendicular to both the vectors.

1. Simplify :
$$\cot^{-1} \Big(\sqrt{1+x^2} - x \Big).$$



2. If
$$y = x^{ an x} + (an x)^x$$
 then find $rac{dy}{dx}$.

3. If sin y = x sin (a + y), then prove that
$$\frac{dy}{dx} = \frac{\sin^2(a+y)}{\sin a}$$
.

4. Show that
$$: \int_0^\pi rac{x}{1+\sin x} dx = \pi.$$

5. Solve the following differential equations

$$\Big(x\sinrac{y}{x}\Big)dy=\Big(y\sinrac{y}{x}-x\Big)dx$$

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6. Solve :
$$rac{dy}{dx} + y \sec x = \tan x.$$



7. From a lot of 20 bulbs which include 5 defectives, a sample of 3 bulbs is drawn at random one by one with replacement. Find the probability distribution of the number of defective bulbs. Also, find the mean of the distribution.

1. Solve the following system of linear equations by matrix method

 $:2x-3y+5z=11,\,3x+2y-4z=\,-5,\,x+y-2z=\,-3$

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2. If
$$A = egin{bmatrix} 2 & 2 \ -2 & 1 \end{bmatrix}$$
, Find A^{-1} .

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3. Find the distance of the point $(\,-1,\,-5,\,-10)$ from the

point of intersection of the line $\overrightarrow{r}=2\hat{i}-\hat{j}+2\hat{k}+\lambda\Big(3\hat{i}+4\hat{j}+2\hat{k}\Big)$ and the plane $\overrightarrow{r}\cdot\Big(\hat{i}-\hat{j}+\hat{k}\Big)=5$



4. Find the equations of the plane through the line of intersection of $\overrightarrow{r} \cdot (2\hat{i} - 3\hat{j} + 4\hat{k}) = 1$ and $\overrightarrow{r} \cdot (\hat{i} - \hat{j}) + 4 = 0$ and perpendicular to the plane $\overrightarrow{r} \cdot (2\hat{i} - \hat{j} + \hat{k}) + 8 = 0$. Hence find whether the plane thus obtained contains the line x - 1 = 2y - 4 = 3z - 12.

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5. Solve the following linear programming problem graphically:

Miximise Z = 5x + 3y subject to the constraints :

 $3x + 5y \le 15$

 $5x + 2y \le 10$

 $x \geq 0, y \geq 0$

6. Solve the following linear programming problem graphically:

Miximise Z = x + 2y subject to the constraints :

 $x+2y\geq 100$

 $2x-y\leq 0$

 $2x+y\leq 200$

 $x \geq 0, y \geq 0$