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CBSE

**CENTRAL BOARD SECONDARY
EXAMINATION**

2022

**CLASS
XII**

Questions & Solutions

Date: 07 Jun, 2022 | TIME : (10.30 a.m. to 12.30 p.m)

Duration: 2 hrs. | Max. Marks: 40



SUBJECT: MATHEMATICS

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SET-1

Code No. **65/3/1**

Roll No.

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Candidates must write the Code or the title page of the answer-book

MATHEMATICS

Time allowed: 2 hours

Maximum Marks: 40

- Please check that this question paper contains 12 printed pages.
 - Q.P. Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
 - Please check that this question paper contains 12 questions.
 - **Please write down the Serial Number of the question in the answer book before attempting it.**
 - 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the candidates will read the question paper only and will not write any answer on the answer-book during this period.
- General Instructions:
 - (i) This question paper contains three Sections - Section A, B and C.
 - (ii) Each Section is compulsory.
 - (iii) Section-A has 6 short answer type-I questions of 2 marks each.
 - (iv) Section-B has 4 short answer type-II questions of 3 marks each.
 - (v) Section-C has 4 long answer type questions of 4 marks each.
 - (vi) There is an internal choice in some questions.
 - (vii) Q. 14 is a case study based problem with 2 sub-parts of 2 marks each.

सामान्य निर्देश:






- इस प्रश्न पत्र के तीन खण्ड-खण्ड क, ख, तथा ग है।
- प्रत्येक खण्ड अनिवार्य है।
- खण्ड-क में 6 लघु उत्तर-I प्रकार के प्रश्न हैं, जिनमें प्रत्येक के 2 अंक है।
- खण्ड-ख में 4 लघु उत्तर-II प्रकार के प्रश्न हैं, जिसमें प्रत्येक के 3 अंक है।
- खण्ड-ग में 4 दीर्घ उत्तरीय प्रश्न हैं, जिसमें प्रत्येक के 4 अंक है।
- कुछ प्रश्नों में आंतरिक विकल्प दिए गए है।
- प्रश्न 14 एक प्रकरण अध्ययन आधारित प्रश्न हैं, जिसमें दो भाग हैं, जिनमें प्रत्येक के 2 अंक है।

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SECTION-A

प्रश्न संख्या 1 से 6 तक प्रत्येक प्रश्न के 2 अंक है।

1. If the distance of the point (1, 1, 1) from the plane $x - y + z + \lambda = 0$ is $\frac{5}{\sqrt{3}}$, find the value(s) of λ .

यदि बिन्दु (1, 1, 1) की समतल $x - y + z + \lambda = 0$ से दूरी $\frac{5}{\sqrt{3}}$ हैं, तो λ के मान ज्ञात कीजिए।

SOL. $D = \frac{|x - y + z + \lambda|}{\sqrt{1^2 + (-1)^2 + (1)^2}} = \frac{5}{\sqrt{3}}$

From point (1, 1, 1)

$$\therefore D = \frac{|1 - 1 + 1 + \lambda|}{\sqrt{3}} = \frac{5}{\sqrt{3}}$$

$$\Rightarrow \frac{|1 + \lambda|}{\sqrt{3}} = \frac{5}{\sqrt{3}}$$

$$\frac{1 + \lambda}{\sqrt{3}} \pm \frac{5}{\sqrt{3}}$$

$$(+) \dots \frac{1 + \lambda}{\sqrt{3}} = \frac{5}{\sqrt{3}} \Rightarrow \lambda = 5 - 1$$

$$\lambda = 4$$

$$(-) \dots \frac{1 + \lambda}{\sqrt{3}} = \frac{-5}{\sqrt{3}} \Rightarrow \lambda = -6$$

2. Write the projection of the vector $(\vec{b} + \vec{c})$ on the vector \vec{a} where

$$2\hat{i} - 2\hat{j} + \hat{k}, \vec{b} = \hat{i} + 2\hat{j} - 2\hat{k} \text{ and } \vec{c} = 2\hat{i} - \hat{j} + 4\hat{k}.$$

सदिश $(\vec{b} + \vec{c})$ का सदिश \vec{a} पर प्रक्षेप ज्ञात कीजिए, जहाँ $\vec{a} = 2\hat{i} - 2\hat{j} + \hat{k}$, $\vec{b} = \hat{i} - 2\hat{j} + 2\hat{k}$ और $\vec{c} = 2\hat{i} - \hat{j} + 4\hat{k}$ है।

Sol. $\vec{b} + \vec{c} = 3\hat{i} + \hat{j} + 2\hat{k}$

$$\vec{a} = 2\hat{i} - 2\hat{j} + \hat{k}$$

Projection $\vec{b} + \vec{c}$ on \vec{a} is

$$\Rightarrow \frac{(3\hat{i} + \hat{j} + 2\hat{k}) \cdot (2\hat{i} - 2\hat{j} + \hat{k})}{\sqrt{4 + 4 + 1}}$$





$$\frac{6 - 2 + 2}{3} = 2$$

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3. Find the general solution of the differential equation: $\frac{dy}{dx} = \frac{3e^{2x} + 3e^{4x}}{e^x + e^{-x}}$

अवकलन समीकरण : $\frac{dy}{dx} = \frac{3e^{2x} + 3e^{4x}}{e^x + e^{-x}}$ का व्यापक हल ज्ञात कीजिए।

Sol. $\frac{dy}{dx} = \frac{3e^{2x} + 3e^{4x}}{e^x + e^{-x}} \Rightarrow dy = \frac{3e^{2x} + 3e^{4x}}{e^x + e^{-x}} dx$

$dy = \frac{3e^{2x}[1 + e^{2x}]}{e^{-x}[e^{2x} + 1]} dx \Rightarrow dy = \int 3e^{3x} dx$

$y = 3 \frac{e^{3x}}{3} + c$

4. Two cards are drawn successively with replacement from a well shuffled pack of 52 cards. Find the probability distribution of the number of spade cards.

ताश के 52 पत्तों की एक सुमिश्रित गड्डी से यादृच्छया दो पत्ते उत्तरोत्तर प्रतिस्थापना के साथ निकाले जाते हैं। हुकुम के पत्तों की संख्या का प्रायिकता बंटन ज्ञात कीजिए।

Sol. $x = 0 \Rightarrow P(x=0) = \frac{39}{52} \times \frac{39}{52} = \frac{9}{16}$

$x = 1 \Rightarrow P(x=1) = \frac{13}{52} \times \frac{39}{52} = \frac{6}{16}$

$x = 2 \Rightarrow P(x=2) = \frac{13}{52} \times \frac{13}{52} = \frac{1}{16}$

x	0	1	2
P(x)	9/16	6/16	1/16

5. Find: $\int \frac{dx}{x^2 - 6x + 13}$

ज्ञात कीजिए : $\int \frac{dx}{x^2 - 6x + 13}$

Sol. $I = \int \frac{dx}{x^2 - 6x + 13}$

$x^2 - 6x + 13 = \Rightarrow (x - 3)^2 + 4$






$\therefore I = \int \frac{dx}{(x-3)^2 + (2)^2} dx = \frac{1}{2} \tan^{-1} \left(\frac{x-3}{2} \right) + C$

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6. A pair of dice is thrown and the sum of the numbers appearing on the dice is observed to be

7. Find the probability that the number 5 has appeared on at least one die.

पासों का एक जोड़ा उछाला जाता है और पासों पर प्राप्त संख्याओं का योगफल 7 है। कम-से-कम एक पासे पर संख्या 5 प्राप्त होने की प्रायिकता ज्ञात कीजिए।

OR
अथवा

The probability that A hits the target is $\frac{1}{3}$ and the probability that B hits it is $\frac{2}{5}$. If both try to hit the target independently, find the probability that the target is hit.

A द्वारा लक्ष्य पर निशाना लगाने की प्रायिकता $\frac{1}{3}$ और B द्वारा निशाना लगाने की प्रायिकता $\frac{2}{5}$ हैं। यदि दोनों, स्वतंत्र रूप से, लक्ष्य पर निशाना साधते हैं, तो लक्ष्य पर निशाना लगाने की प्रायिकता ज्ञात कीजिए।

Sol. A pair of dice is thrown total number of events

$$\Rightarrow 6 \times 6 = 36$$

Let E \Rightarrow sum of the number appearing on the dice is to be 7

F \Rightarrow number 5 has appeared on atleast one dice

$$E = \{16, 25, 34, 45, 51, 52, 53, 54, 55, 56\}$$

$$F = \{15, 25, 35, 45, 51, 52, 53, 54, 55, 56\}$$

$$E \cap F = \{25, 52\}$$

$$P(E) = \frac{6}{36}$$

$$P(E \cap F) = \frac{2}{36}$$

$$P\left(\frac{F}{E}\right) = \frac{P(E \cap F)}{P(E)} = \frac{\frac{2}{36}}{\frac{6}{36}} = \frac{1}{3}$$

OR

$$P(A) = \frac{1}{3}$$

$$P(B) = \frac{2}{5}$$

$$P(A') = \frac{2}{3}$$

$$P(B') = \frac{3}{5}$$

$$P(A) P(B') + P(A') P(B) + P(A) P(B)$$






$$\frac{1}{3} \times \frac{3}{5} + \frac{2}{3} \times \frac{2}{5} + \frac{1}{3} \times \frac{2}{5} \Rightarrow \frac{1}{5} + \frac{4}{15} + \frac{2}{15} \Rightarrow \frac{3+4+2}{15} = \frac{9}{15}$$

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SECTION-2

खण्ड - ख

Question Nos. 7 to 10 Carry 3 marks each
प्रश्न संख्या 7 से 10 तक प्रत्येक प्रश्न के 3 अंक हैं।

7. Evaluate : $\int_0^{2\pi} \frac{dx}{1+e^{\sin x}}$

मान ज्ञात कीजिए : $\int_0^{2\pi} \frac{dx}{1+e^{\sin x}}$

Sol. $I = \int_0^{2\pi} \frac{dx}{1+e^{\sin x}} \dots\dots(i)$

Using property....

$$I = \int_0^{2\pi} \frac{dx}{1+e^{\sin(2\pi-x)}} \Rightarrow I = \int_0^{2\pi} \frac{dx}{1+e^{-\sin x}}$$

$$I = \int_0^{2\pi} \frac{e^{\sin x}}{1+e^{\sin x}} dx \dots\dots(ii)$$

Adding equation (i) and (ii)

$$2I = \int_0^{2\pi} \frac{1+e^{\sin x}}{1+e^{\sin x}} dx = \int_0^{2\pi} 1 dx$$

$$2I = [x]_0^{2\pi} \Rightarrow 2\pi$$

$$I = \pi$$

8. Find the particular solution of the differential equation $x \frac{dy}{dx} - y = x^2 \cdot e^x$ given $y(1) = 0$

अवकल समीकरण $x \frac{dy}{dx} - y = x^2 \cdot e^x$ का विशिष्ट हल ज्ञात कीजिए, $y(1) = 0$ दिया गया है।

OR अथवा

Find the general solution of the differential equation $x \frac{dy}{dx} = y(\log y - \log x + 1)$

अवकल समीकरण $x \frac{dy}{dx} = y(\log y - \log x + 1)$ का व्यापक हल ज्ञात कीजिए।

Sol. $x \frac{dy}{dx} - y = x^2 e^x$

$$\frac{dy}{dx} - \frac{y}{x} = x e^x$$

here $P = -\frac{1}{x}$; $Q = x e^x$






$$\therefore \text{I. F.} = e^{\int P dx}$$

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$$= e^{\int -\frac{1}{x} dx}$$

$$= e^{-\log x}$$

$$= \frac{1}{x}$$

$$y \times \frac{1}{x} = \int_1^x x e^x \times \frac{1}{x} dx + C$$

$$\frac{y}{x} = e^x + c \Rightarrow x = 1 ; y = 0$$

$$0 = e + c$$

$$\Rightarrow c = -e$$

$$\text{Sol. } \frac{y}{x} = e^x - e$$

OR

$$x \frac{dy}{dx} = y(\log y - \log x + 1)$$

$$\frac{dy}{dx} = \frac{y}{x} \left[\log \left(\frac{y}{x} \right) + 1 \right]$$

$$y = vx$$

$$\frac{dy}{dx} = v + x \frac{dv}{dx}$$

$$v + x \frac{dv}{dx} = v[\log v + 1]$$

$$x \frac{dv}{dx} = v \log v$$

$$\int \frac{dv}{v \log v} = \int \frac{dx}{x}$$

$$\log(\log v) = \log x + c$$

$$\log \left(\log \frac{y}{x} \right) = \log x + c$$

9. The two adjacent sides of a parallelogram are represented by vector $2\hat{i} - 4\hat{j} + 5\hat{k}$ and $\hat{i} - 2\hat{j} - 3\hat{k}$. Find the unit vector parallel to one of its diagonals Also find the area of the parallelogram.

एक समांतर चतुर्भुज की संलग्न भुजाएँ सदिश $2\hat{i} - 4\hat{j} + 5\hat{k}$ और $\hat{i} - 2\hat{j} - 3\hat{k}$ द्वारा निरूपित हैं। इसके एक विकर्ण के समांतर मात्रक सदिश ज्ञात कीजिए। समांतर चतुर्भुज का क्षेत्रफल भी ज्ञात कीजिए।

OR अथवा

If $\vec{a} = 2\hat{i} + 2\hat{j} + 3\hat{k}$, $\vec{b} = -\hat{i} + 2\hat{j} + \hat{k}$ and $\vec{c} = 3\hat{i} + \hat{j}$ are such that the vector $(\vec{a} + \lambda\vec{b})$ is perpendicular to vector \vec{c} , then find the value of λ .






यदि $\vec{a} = 2\hat{i} + 2\hat{j} + 3\hat{k}$, $\vec{b} = -\hat{i} + 2\hat{j} + \hat{k}$ तथा $\vec{c} = 3\hat{i} + \hat{j}$ ऐसे सदिश हैं कि सदिश $(\vec{a} + \lambda\vec{b})$, सदिश \vec{c} के लंबवत् है, तो λ का मान ज्ञात कीजिए।

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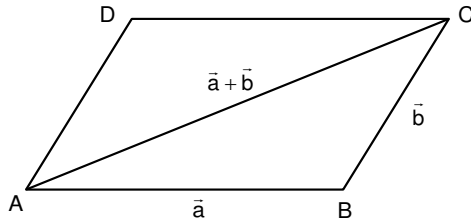
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Sol. Adjacent sides of parallelogram



$$\vec{a} = 2\hat{i} - 4\hat{j} + 5\hat{k}$$

$$\vec{b} = \hat{i} - 2\hat{j} - 3\hat{k}$$

$$\therefore \vec{a} + \vec{b} = 3\hat{i} - 6\hat{j} + 2\hat{k}$$

$$\therefore \text{unit vector} \Rightarrow \frac{3\hat{i} - 6\hat{j} + 2\hat{k}}{\sqrt{9+36+4}} \Rightarrow \frac{3\hat{i} - 6\hat{j} + 2\hat{k}}{7}$$

Area of parallelogram

$$|\vec{a} \times \vec{b}| \Rightarrow \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 2 & -4 & 5 \\ 1 & -2 & -3 \end{vmatrix} \Rightarrow (12 + 10)\hat{i} - \hat{j}(-6 - 5) + \hat{k}(-4 + 4)$$

$$\Rightarrow 22\hat{i} + 11\hat{j} = \sqrt{(22)^2 + (11)^2} = \sqrt{605}$$

OR

$$\vec{a} = 2\hat{i} + 2\hat{j} + 3\hat{k}, \quad \vec{b} = -\hat{i} - 2\hat{j} + \hat{k}$$

$$\vec{c} = 3\hat{i} + \hat{j}$$

$$\vec{a} + \lambda\vec{b} = (2 - \lambda)\hat{i} + (2 + 2\lambda)\hat{j} + (3 + \lambda)\hat{k}$$

$\vec{a} + \vec{b}$ is perpendicular to \vec{c}

$$\therefore (\vec{a} + \lambda\vec{b}) \cdot \vec{c} = 0$$

$$[(2 - \lambda)\hat{i} + (2 + 2\lambda)\hat{j} + (3 + \lambda)\hat{k}] \cdot (3\hat{i} + \hat{j}) = 0$$

$$6 - 3\lambda + 2 + 2\lambda = 0$$

$$8 - \lambda = 0 \Rightarrow \lambda = 8$$

10. Show that the lines $\frac{1-x}{2} = \frac{y-3}{4} = \frac{z}{-1}$ and $\frac{x-4}{3} = \frac{2y-2}{-4} = z-1$ are coplanar.

Sol. line $\frac{1-x}{2} = \frac{y-3}{4} = \frac{z}{-1}$

$$\frac{x-1}{(-2)} = \frac{y-3}{4} = \frac{z}{-1} \dots\dots(i)$$

$$\frac{x-4}{3} = \frac{2y-2}{-4} = \frac{z-1}{1}$$

$$\frac{x-4}{3} = \frac{y-1}{(-2)} = \frac{z-1}{1} \dots\dots(2)$$

$$\begin{vmatrix} x_2 - x_1 & y_2 - y_1 & z_2 - z_1 \\ a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \end{vmatrix} = 0$$

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$$\begin{vmatrix} 4 & -1 & 1 & -3 & 1 & -0 \\ -2 & 4 & -1 & & & \\ 3 & -2 & 1 & & & \end{vmatrix} = \begin{vmatrix} 3 & -2 & 1 \\ -2 & 4 & -1 \\ 3 & -2 & 1 \end{vmatrix}$$

$$\Rightarrow 6 + 2 - 8 \Rightarrow 0$$

hence lines will be coplanar

SECTION-C

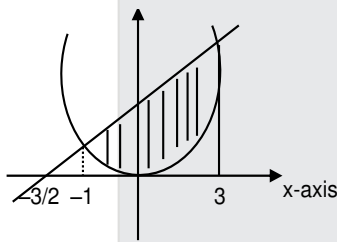
Question Nos. 11 to 14 Carry 4 marks each

प्रश्न संख्या 11 से 14 तक प्रत्येक प्रश्न के 4 अंक हैं।

11. Find the area of the region bounded by curve $4x^2 = y$ and the line $y = 8x + 12$, using integration.

समाकलन के प्रयोग से, वक्र $4x^2 = y$ और रेखा $y = 8x + 12$ से घिरे क्षेत्र का क्षेत्रफल ज्ञात कीजिए।

Sol.



Intersection point

Putting the value of y in equation(ii)

$$\therefore 4x^2 = 8x + 12$$

$$4x^2 - 8x - 12 = 0$$

$$x^2 - 2x - 3 = 0$$

$$x^2 - 3x + x - 3 = 0$$

$$x(x-3) + 1(x-3) = 0$$

$$x = -1 : 3$$

curve $4x^2 = y$..(i)

Line $y = 8x + 12$..(ii)

Now area

$$\therefore \int_{-1}^3 y(\text{line}) dx - \int_{-1}^3 y(\text{curve}) dx$$

$$\Rightarrow \int_{-1}^3 (8x + 12) dx - \int_{-1}^3 4x^2 dx$$

$$\Rightarrow \left[\frac{8x^2}{2} \right]_{-1}^3 + 12[x]_{-1}^3 - \left\{ \frac{4x^3}{3} \right\}_{-1}^3$$

$$\Rightarrow 4[9-1] + 12[3+1] - \frac{4}{3} \{27+1\}$$

$$\Rightarrow 32 + 48 - \frac{4}{3} \times 28$$

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$$\Rightarrow 80 - \frac{4 \times 28}{3}$$

$$\Rightarrow \frac{240 - 112}{3}$$

$$\Rightarrow 128/3 \text{ square unit Ans.}$$

12. Find : $\int \frac{x^2}{(x^2+1)(3x^2+4)} dx$

OR

Evaluate : $\int_{-2}^1 \sqrt{5-4x-x^2} dx$

ज्ञात कीजिए : $\int \frac{x^2}{(x^2+1)(3x^2+4)} dx$

अथवा

मान ज्ञात कीजिए : $\int_{-2}^1 \sqrt{5-4x-x^2} dx$

Sol. Find $\int \frac{x^2}{(x^2+1)(3x^2+4)} dx$

Let $x^2 = t$

$$\therefore \int \frac{t}{(t+1)(3t+4)}$$

Using partially Fra chain

$$\int \frac{t}{(t+1)(3t+4)} = \frac{A}{t+1} + \frac{B}{3t+4}$$

$$\frac{t}{(t+1)(3t+4)} = \frac{3At + 4A + Bt + B}{(t+1)(3t+4)}$$

$$t = (3A+B)t + (4A+B)$$

$$3A + B = 1 \text{ and } 4A + B = 0$$

$$B = -4A$$

$$\therefore 3A - 4A = 1$$

$$\therefore B = 4$$

$$A = -1$$

$$\therefore \frac{-1}{t+1} + \frac{4}{3t+4} \quad \{ t = x^2 \}$$

$$= \int \frac{-1}{x^2+1} + \int \frac{4}{3x^2+4} = -\tan^{-1} x + 4 \int \frac{4}{(\sqrt{3}x)^2 - (2)^2} dx$$

$$= -\tan^{-1} x + 4 \times \frac{1}{\sqrt{3} \times 2} \tan^{-1} \frac{\sqrt{3}x}{2} + c$$






$$= -\tan^{-1} x + \frac{2}{\sqrt{3}} \tan^{-1} \frac{\sqrt{3}x}{2} + c \text{ Ans.}$$

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OR

$$\int_{-2}^1 \sqrt{5+4x-x^2} dx$$

$$\Rightarrow 5-4x-x^2 \Rightarrow -(x^2+4x-5) = ((x+2)^2-9) = [9-(x+2)^2]$$

$$\therefore \int_{-2}^1 \sqrt{9-(x+2)^2} dx$$

$$\int_{-2}^1 \sqrt{(3)^2-(x+2)^2} dx$$

$$\Rightarrow \left[\frac{x+2}{2} \sqrt{9-(x+2)^2} + \frac{9}{2} \sin^{-1} \frac{(x+2)}{3} \right]_{-2}^1$$

$$\Rightarrow \left(\frac{3}{2} \times 0 + \frac{9}{2} \times \frac{\pi}{2} \right) - \left(0 + \frac{9}{2} \times 0 \right)$$

$$\Rightarrow \frac{9\pi}{4}$$

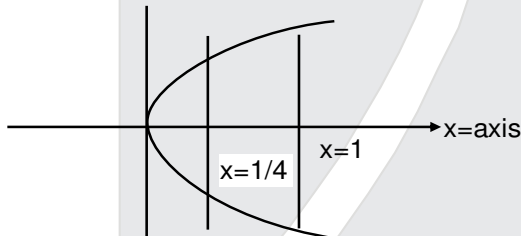
13. Find the area of the region enclosed by the curves $y^2 = x = \frac{1}{4}$, $y = 0$ and $x = 1$ integration.

समाकलन के प्रयोग से वक्रों $y^2 = x$, $x = \frac{1}{4}$, $y = 0$ और $x = 1$ से घिरे क्षेत्र का क्षेत्रफल ज्ञात कीजिए—

प्रकरण अध्ययन आधारित प्रश्न :

Sol. Curve $y^2 = x$

line $x = \frac{1}{4}$, $y = 0$ and $x = 1$



Area of shaded part :

$$\Rightarrow 2 \int_{\frac{1}{4}}^1 y dx \Rightarrow 2 \int_{\frac{1}{4}}^1 \sqrt{x} dx \Rightarrow 2 \left[\frac{x^{\frac{3}{2}}}{\frac{3}{2}} \right]_{\frac{1}{4}}^1 \Rightarrow 2 \times \frac{2}{3} \left[(1)^{\frac{3}{2}} - \left(\frac{1}{4} \right)^{\frac{3}{2}} \right]$$

$$\Rightarrow \frac{4}{3} \left[1 - \frac{1}{8} \right] \Rightarrow \frac{4}{3} \times \frac{7}{8} = \frac{7}{6} \text{ square unit} \quad \text{Ans.}$$

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Case Study Problem:

प्रकरण अध्ययन आधारित प्रश्न :

14. A shopkeeper sells three types of flower seeds A₁, and A₂, A₃. They are sold in the form of a mixture where the proportions of these seeds are 4: 4: 2, respectively. The germination rates of the three types of seeds are 45%, 60%, 35% respectively.

बक दुकानदार तीन प्रकार के फुल-बीज A₁, A₂, A₃ बेचता है। वह इ बीजों को एक मिश्रण के रूप में बेचता है जिसमें इन तीन प्रकारों के बीज 4:4:2 के अनुपात में मिश्रित है। इन तीनों बीजों की अंकुरण दर क्रमशः 45%, 60%, और 35% है।



Based on the above information

उपरोक्त पर आधारित होकर, निम्न प्रश्नों के उत्तर दीजिए:

- (a) Calculate the probability that a randomly chosen seeds will germinate;
यादृच्छया चुने एक बीज अंकुरित हाने की प्रायिकता ज्ञात कीजिए।
- (b) Calculate the probability that the seed is type A₂, given that a randomly chosen seed germinates.
यदि यह दिया गया है कि एक यादृच्छया चुना बीज अंकुरित होता है, तो इस बीज का प्रकार A₂ होने की प्रायिकता ज्ञात कीजिए।

Sol. $P(A_1) = \frac{4}{10}$

$$P(A_2) = \frac{4}{10}$$

$$P(A_3) = \frac{2}{10}$$






$$P\left(\frac{B}{A_1}\right) = 0.45$$

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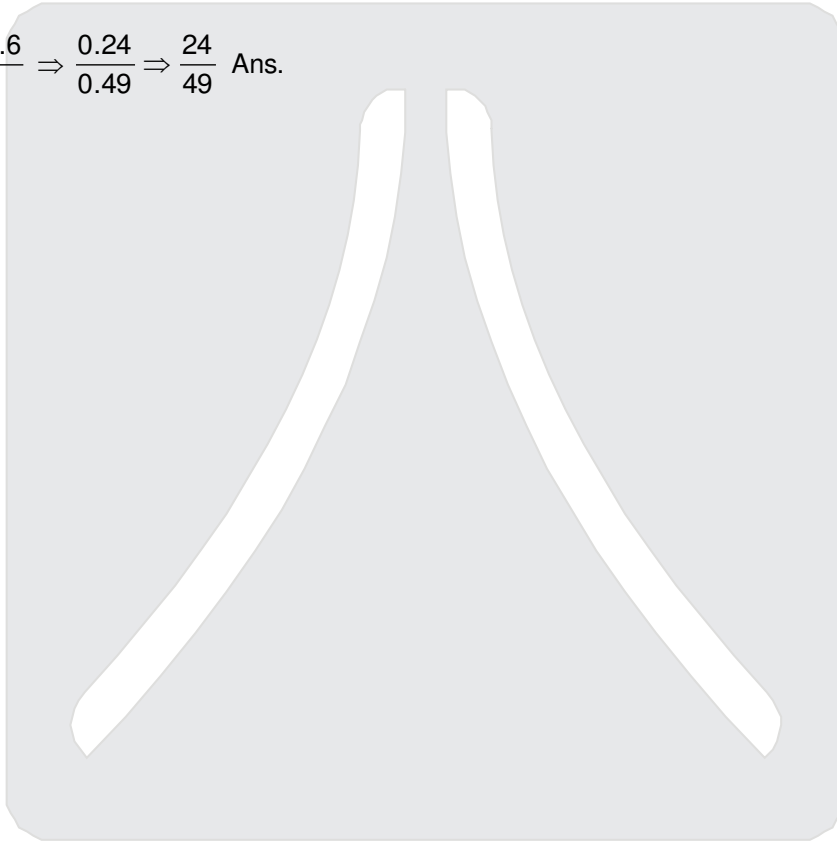
$$P\left(\frac{B}{A_2}\right) = 0.6$$

$$P\left(\frac{B}{A_3}\right) = 0.35$$

$$(i) \quad P(B) = P(A_1) \times P\left(\frac{B}{A_1}\right) + P(A_2) \times P\left(\frac{B}{A_2}\right) + P(A_3) \times P\left(\frac{B}{A_3}\right) = 0.4 \times 0.45 + 0.4 \times 0.6 + 0.2 \times 0.35 \Rightarrow 0.49 \text{ Ans.}$$

$$(ii) \quad P\left(\frac{A_2}{B}\right) = \frac{P(A_2) \times P\left(\frac{B}{A_2}\right)}{P(B)}$$

$$= \frac{0.4 \times 0.6}{0.49} \Rightarrow \frac{0.24}{0.49} \Rightarrow \frac{24}{49} \text{ Ans.}$$







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