केवल मूल्यांकनकर्ता के उपयोग हेतु!

माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल

32 पृष्ठीय

केवल परीक्षक द्वारा भरा जावे। प्रश्न क्रमांक के सम्मुख प्राप्तांकों की प्रविष्टी करें।

प्रश्न क्रमांक	पृष्ठ क्रमांक	प्राप्तांक (अ	प्रश्न क्रमांक	पृष्ठ क्रमांक	प्राप्तांक (अंकों में)
1			17		
2			18		
3			19		
4			20		
5			21		
6			22		
7			23		
8			24		
9			25		
10			26		
11			27		
12			28		
13					
14					
15			मूल प्राप्तांक शब्दों में		प्राप्तांक अंकों में
16					

परीक्षक एवं उपमुख्य परीक्षक द्वारा भर...

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे

प्रमाणित किया जाता है कि अन्दर के पृष्ठों के अनुरूप मुख्य पृष्ठ पर अंकों की प्रविष्टी एवं अंकों का योग सही है।

निर्धारित मुद्राः नाम, पदनाम, मोबाईल नम्बर, परीक्षक क्रमांक एवं पदांकित संस्था के नाम की मुद्रा लगाएं।

उप मुख्य परीक्षक के हस्ताक्षर एवं निर्धारित मुद्रा	परीक्षक के हस्ताक्षर एवं निर्धारित मुद्रा
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② योग पूर्व पृष्ठ + पृष्ठ 2 के अंक = कुल अक

माध्यमिक शिक्षा मण्डल मध्यप्रदेश

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Question 1.
Fill in the Blanks

Answers :-

(1.) $\frac{1}{x \log x}$

(2.) 12π ~~cm~~^{2}

(3.) x

(4.) 1

(5.) 2

(6.) 0

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Question 2.
True / false.

Answers :-

(1.) True

(2.) False

(3.) True

(4.) False.

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(5.) false

(6.) True

Question 7.

Match the coloumn.

'A'	'B'
(1.) $\int \frac{dx}{\sqrt{x^2+a^2}}$	$\log\lvert x+\sqrt{x^2+a^2}\rvert+c$
(2.) $\int \sqrt{x^2+a^2}\,dx.$	$\frac{x}{2}\sqrt{x^2+a^2}+\frac{a^2}{2}\log\lvert x+\sqrt{x^2+a^2}\rvert+c$
(3.) $\int \tan x\,dx.$	$\log\lvert\sec x\rvert+c$
(4.) $\int \cot x\,dx$	$\log\lvert\sin x\rvert+c.$
(5.) $\int \sqrt{x^2-9}\,dx.$	$\frac{x}{2}\sqrt{x^2-9}-\frac{9}{2}\log\lvert x+\sqrt{x^2-9}\rvert+c.$
(6.) $\int \frac{1}{\sqrt{x^2-9}}\,dx.$	$\log\lvert x+\sqrt{x^2-9}\rvert+c.$

B
S
E

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(7.) simplest form of $\tan\left(\frac{1}{\sqrt{x^2-1}}\right)$, $x>1$. $\csc^{-1}x$.

Question 4.
Write one word.

(1.) 0. is the minimum value

(2.) $\frac{16}{25}$ or 0.64.

(3.) A matrix in which all diagonal elements are equal or same (K) and non-diagonal elements are 0.

$$a_{ij} = K, \quad i=j.$$
$$a_{ij} = 0, \quad i\neq j.$$

(4.) 2.

(5.) -2.

(6.) $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

(7.) $[1, \infty)$.

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Question 5.

Choose the correct options.

(1.) (a) f is one-one onto.

(2.) $\frac{3\pi}{4}$

(3.) $\frac{\pi}{3}$.

(4.) $\pm\sqrt{3}$.

(5.) $\theta = \frac{\pi}{2}$.

(6.) 1/36.

Question 6.

Given that :-

$$A = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}.$$

To find :- Adjoint of matrix A.

find :-.

we know that,

Adjoint of a matrix is the transpose of cofactor matrix.

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cofactor $(A_{ij}) = (-1)^{i+j} M_{ij}$.

$\cancel{A_{11} = (-1)^{1+1}}$ $\quad A_{11} = (-1)^{1+1} M_{11} = (-1)^{1+1} 4 = 4$.

$A_{12} = (-1)^{1+2} M_{12} = (-1)^{1+2} 1 = -1$.

$A_{21} = (-1)^{2+1} M_{21} = (-1)^{2+1} 3 = -3$.

$A_{22} = (-1)^{2+2} M_{22} = (-1)^{2+2} 2 = 2$.

B
S
E

Adjoint of A is given by $\begin{bmatrix} A_{11} & A_{21} \\ A_{12} & A_{22} \end{bmatrix}$

$= \begin{bmatrix} 4 & -3 \\ -1 & 2 \end{bmatrix}$.

Question 7.

$2x + 3y = \sin y$.

differentiating with respect to x.
on both sides,

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$$\frac{d}{dx}(2x) + \frac{d}{dx}(3y) = \frac{d}{dx}\sin y$$

$$\cancel{2x} \quad 2\frac{d}{dx}x + 3\frac{d}{dx}y = \frac{d}{dx}\sin y.$$

$$2 + 3\frac{dy}{dx} = \cos y \cdot \frac{dy}{dx}.$$

$$2 = \cos y \cdot \frac{dy}{dx} - 3\frac{dy}{dx}.$$

$$2 = \frac{dy}{dx}(\cos y - 3).$$

$$\frac{dy}{dx} = \frac{2}{\cos y - 3} \quad \text{Ans.}$$

Question 8. [or]

$$\int_0^{\frac{\pi}{2}} \frac{\sin^4 x}{\sin^4 x + \cos^4 x}\, dx.$$

we know that →

$$\int_0^{\frac{\pi}{2}} f(x)\, dx = \int_0^{\frac{\pi}{2}} f\left(\frac{\pi}{2} - x\right) dx.$$

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so,

$$I = \int_0^{\frac{\pi}{2}} \frac{\sin^4 x}{\sin^4 x + \cos^4 x}\,dx \quad \text{— (I)}$$

$$I = \int_0^{\frac{\pi}{2}} \frac{\sin^4\left(\frac{\pi}{2} - x\right)}{\sin^4\left(\frac{\pi}{2}-x\right) + \cos^4\left(\frac{\pi}{2}-x\right)}\,dx$$

$$I = \int_0^{\frac{\pi}{2}} \frac{\cos^4 x}{\cos^4 x + \sin^4 x}\,dx \quad \text{— (II)}$$

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Adding eq^n (I) & (II) $\rightarrow$

$$2I = \int_0^{\frac{\pi}{2}} \frac{\sin^4 x + \cos^4 x}{\cos^4 x + \sin^4 x}\,dx$$

$$2I = \int_0^{\frac{\pi}{2}} \frac{\cancel{\sin^4 x + \cos^4 x}}{\cancel{\sin^4 x + \cos^4 x}}\,dx$$

$$2I = \int_0^{\frac{\pi}{2}} dx$$

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

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$$2I = \frac{\pi}{2}$$

$$I = \frac{\pi}{4}.$$

Question 9.

given that :-

$$y = e^{-3x}.$$

to show :- $y = e^{-3x}$ is the solution of $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 6y = 0.$

show :-

$$y = e^{-3x}.$$

diffrentiating with respect to x :-

$$\frac{d}{dx} y = \frac{d}{dx} e^{-3x}$$

$$\frac{dy}{dx} = e^{-3x} \frac{d}{dx}(-3x).$$

$$\frac{dy}{dx} = -3e^{-3x}$$

again diff. with respect to x.

$$\frac{d}{dx}\left(\frac{dy}{dx}\right) = -3 \frac{d}{dx}(e^{-3x}).$$

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$$\frac{d^2y}{dx^2} = -3 \cdot e^{-3x} \frac{d}{dx}(-3x)$$

$$\frac{d^2y}{dx^2} = -3 \cdot e^{-3x} \cdot (-3)$$

$$\frac{d^2y}{dx^2} = 9e^{-3x}$$

Taking differential equation ⊳.

$$\frac{d^2y}{dx^2} + \frac{dy}{dx} - 6y = 0.$$

$$9e^{-3x} + (-3e^{-3x}) - 6(e^{-3x}) = 0.$$

$$9e^{-3x} - 3e^{-3x} - 6e^{-3x} = 0$$

$$9\cancel{e}^{-3x} - 9\cancel{e}^{-3x} = 0$$

$$0 = 0$$

L.H.S. = R.H.S.

Hence, $y = e^{-3x}$ is the solution of $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 6y = 0$.

Question 10. [or]

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given that ⇒.

$\vec{a} = 2\hat{i} + 3\hat{j} + 2\hat{k}$.

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

To find ⇒ projection of $\vec{a}$ on $\vec{b}$.

find ⇒.

we know that,

projection of $\vec{a}$ on $\vec{b}$ is given by ⇒ $\frac{\vec{a} \cdot \vec{b}}{|\vec{b}|}$

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

$\Rightarrow \frac{2(1) + 3(2) + 2(1)}{\sqrt{1+4+1}}$

$\Rightarrow \frac{2+6+2}{6}$

$\Rightarrow \frac{10}{\sqrt{6}}$ or $\frac{5\sqrt{6}}{3}$

2
6
2
10

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Question 11. [or].

given that :- $\vec{a}$ is a unit vector.

$$|\vec{a}| = 1.$$

& $(\vec{x} - \vec{a}) \cdot (\vec{x} + \vec{a}) = 12.$

To find :- $|\vec{x}|$.

find :-

according to the questions :-

$(\vec{x} - \vec{a}) \cdot (\vec{x} + \vec{a}) = 12.$

$\vec{x} \cdot \vec{x} + \vec{x} \cdot \vec{a} - \vec{a} \cdot \vec{x} - \vec{a} \cdot \vec{a} = 12.$ $[\because \vec{x} \cdot \vec{a} = \vec{a} \cdot \vec{x}]$

$|\vec{x}|^2 + \cancel{\vec{x} \cdot \vec{a}} - \cancel{\vec{x} \cdot \vec{a}} - |\vec{a}|^2 = 12.$

$|\vec{x}|^2 - |\vec{a}|^2 = 12.$ $[|\vec{a}| = 1 \text{ so } |\vec{a}|^2 = 1]$

$|\vec{x}|^2 - 1 = 12$

$|\vec{x}|^2 = 12 + 1$

$|\vec{x}|^2 = 13.$

$|\vec{x}| = \sqrt{13}.$

Question 12. [or].

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given that :-

line$_1$ = $\frac{x-5}{7} = \frac{y+2}{-5} = \frac{z}{1}$

line$_2$ = $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$.

To show :- $l_1 \perp l_2$.

show :-

we know that,

If two lines are perpendicular than,

$a_1 a_2 + b_1 b_2 + c_1 c_2 = 0$. —(1)

from the above information :-

$a_1 = 7$. , $b_1 = -5$, $c_1 = 1$

$a_2 = 1$, $b_2 = 2$, $c_2 = 3$.

puting these value in eq(1).

$7(1) + (-5)(2) + 1(3). = 0$

$7 - 10 + 3. = 0$

$\cancel{10} - \cancel{10}\ 0 = 0$

L.H.S. = R.H.S.

Hence, the given two lines are perpendicular to each other.

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Question 13.

given that :-

$A = \{1, 2, 3\}$.

$R = \{(1,2)(2,1)\}$.

To show :-

Symmetric but neither reflexive nor transitive.

show :-

~~for~~ R

We know that :-

for Reflexive. :-

$(a, a) \in R \; \forall \; a \in A$.

But, $(1,1) \notin R$.

So, Not Reflexive.

for symmetric. :-

If $(a, b) \in R$ than $(b, a) \in R$.

Here,

$(1,2) \in R$

$(2,1) \in R$.

so, It is symmetric.

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for transitive $\forall$.

If $(a,b) \in R$, $(b,c) \in R$.

than $(a,c) \in R$.

$(1,2) \in R$

$(2,1) \in R$

But $(1,1) \notin R$.

Hence, Not transitive.

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Question 14. [or].

$$\tan^{-1}(\sqrt{3}) - \sec^{-1}(-2).$$

$$\frac{\pi}{3} - \left(\pi - \frac{\pi}{3}\right).$$

$$\frac{\pi}{3} - \left(\frac{3\pi - \pi}{3}\right)$$

$$\frac{\pi}{3} - \frac{2\pi}{3}.$$

$$\frac{-\pi}{3}$$

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Question 15.

$$x\begin{bmatrix}2\\3\end{bmatrix} + y\begin{bmatrix}-1\\1\end{bmatrix} = \begin{bmatrix}10\\5\end{bmatrix}$$

$$\begin{bmatrix}2x\\3x\end{bmatrix} + \begin{bmatrix}-y\\y\end{bmatrix} = \begin{bmatrix}10\\5\end{bmatrix}$$

$$\begin{bmatrix}2x-y\\3x+y\end{bmatrix} = \begin{bmatrix}10\\5\end{bmatrix}$$

As the given matrices are equal, therefore
By equality of matrices there corresponding elements will be equal

$2x - y = 10$ — (I)

and $3x + y = 5$. — (II)

By substitution method ~~to~~. ~~pro~~

$$\begin{aligned} 2x - \cancel{y} &= 10 \\ 3x + \cancel{y} &= 5 \\ \hline 5x &= 15. \end{aligned} \quad \boxed{x = 3}$$

~~2~~ ~~2x - y = 10~~
~~2~~

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putting this value of x in eq^n (1)

$2(3) - y = 10$

$6 - y = 10$

$-y = 10 - 6$

$\boxed{y = -4.}$

Hence,
the value of x is 3
and y is -4.

Question 16. [or].

Given that → . $\frac{x^2}{4} + \frac{y^2}{9} = 1.$

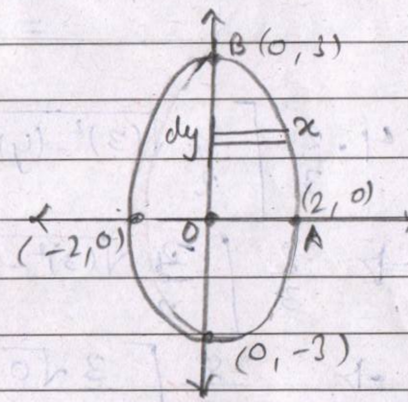
to find → Area enclosed by ellipse

find →.

As per question →.

$\frac{x^2}{4} + \frac{y^2}{9} = 1.$

$\frac{x^2}{(2)^2} + \frac{y^2}{(3)^2} = 1.$



$a = 3.$, $b = 2.$ If ellipse in on y axis.

Area of ellipse = 4 × Area of OABO.

Area of OABO → $\int_0^3 x \, dy$.

to find. x →.

$\frac{x^2}{4} + \frac{y^2}{9} = 1.$ → . $\frac{x^2}{4} = 1 - \frac{y^2}{9}.$

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$$\frac{x^2}{4} = \frac{9-y^2}{9}$$

$$x^2 = \sqrt{\frac{4}{9}}\sqrt{9-y^2} = \frac{2}{3}\sqrt{9-y^2}$$

Now,

$$\text{Area of Ellipse} = 4 \times \int_0^3 x \, dy$$

$$= 4 \times \int_0^3 \frac{2}{3}\sqrt{9-y^2}\, dy$$

$$= 4 \cdot \frac{2}{3}\int_0^3 \sqrt{(3)^2-(y)^2}\, dy$$

$$\Rightarrow 4 \cdot \frac{2}{3}\left[\frac{y}{2}\sqrt{(3)^2-(y)^2} + \frac{(3)^2}{2}\sin^{-1}\frac{y}{3}\right]_0^3 \quad \left[\because \sqrt{(3)^2-y^2} = \frac{y}{2}\sqrt{a^2-y^2} + \frac{a^2}{2}\sin^{-1}\frac{y}{a} + c\right]$$

$$\Rightarrow \frac{8}{3}\left[\frac{3}{2}\sqrt{(3)^2-(3)^2} + \frac{9}{2}\sin^{-1}\frac{3}{3} - 0\right]$$

$$\Rightarrow \frac{8}{3}\left[\frac{3\sqrt{0}}{2} + \frac{9}{2}\sin^{-1} 1\right]$$

$$\frac{8}{3} \times \frac{9}{2}\sin^{-1} 1 \quad \left(\sin^{-1} 1 = \frac{\pi}{2}\right)$$

$$\frac{\cancel{8}}{\cancel{3}} \times \frac{\cancel{9}}{\cancel{2}} \times \frac{\pi}{\cancel{2}}$$

$$\Rightarrow 6\pi$$

B
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E

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Question 17. [last page on graph].

Question 18. [or].

given that :

a die is thrown once

$S = \{1, 2, 3, 4, 5, 6\}$.

$E = \{3, 6\}$.

$F = \{2, 4, 6\}$.

To find : whether E and F are independent.

find :

we know that,

Two events are independent if, $P(A \cap B) = P(A) \cdot P(B)$.

~~P(A~~ $E \cap F = \{6\}$.

$P(E \cap F) = \frac{1}{6}$.

$P(E) = \frac{2}{6}$. and $P(F) = \frac{3}{6}$.

Now, $P(E \cap F) = P(E) \cdot P(F)$.

$\frac{1}{6} = \frac{\cancel{2}^{1}}{\cancel{6}_{3}} \times \frac{\cancel{3}^{1}}{\cancel{6}_{2}}$

$\frac{1}{6} = \frac{1}{6}$.

L.H.S. = R.H.S.

Hence, given two events are independent

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Question 19.

given that → let the radius of the circular waves are r cm.

$$\frac{dr}{dt} = 4 \text{ cm/s}.$$

to find → $\left.\frac{dA}{dt}\right|_{r=10cm} = ?$

or, rate of change of area.

find →.

Area of circle $= \pi r^2$.

$$\frac{d(A)}{dt} = \frac{d}{dt}\pi r^2$$

$$\frac{dA}{dt} = \pi \frac{d}{dt}(r^2)$$

$$\frac{dA}{dt} = 2r\pi \cdot \frac{dr}{dt}$$

$$\frac{dA}{dt} = 2r\pi\,(4) \qquad \left[\frac{dr}{dt} = 4cm/s\right]$$

$$\frac{dA}{dt} = 8(10)\pi \qquad [r = 10\,cm]$$

$$\frac{dA}{dt} = 80\pi \text{ cm}^2/\text{s}.$$

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Hence, the area of the circular waves is increasing at the rate of $80\pi\ cm^2/s$.

Question 20. [or]

$$I = \int \frac{x e^x}{(1+x)^2}\,dx.$$

$$I = \int e^x \cdot \frac{x}{(1+x)^2}\,dx.$$

$$I = \int e^x \cdot \frac{1+x-1}{(1+x)^2}\,dx.$$

$$I = \int e^x \cdot \left(\frac{\cancel{1+x}}{(1+x)^{\cancel{2}}} - \frac{1}{(1+x)^2}\right)dx.$$

$$I = \int e^x \left(\frac{1}{1+x} - \frac{1}{(1+x)^2}\right)dx.$$

we know that, $\int e^x\,(f(x) + f'x)\,dx$
$= e^x\,(f(x) + c.$

B S E

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B
S
E

Here, $\frac{1}{1+x} = f(x)$.

$$\frac{d}{dx} f(x) = \frac{d}{dx} \frac{1}{1+x}.$$

$$f'x = \frac{(1+x)\frac{d}{dx}(1) - (1)\frac{d}{dx}(1+x)}{(1+x)^2}.$$

$$f'x = \frac{-1}{(1+x)^2}.$$

So,

$$\int e^x \frac{1}{1+x} + \left(\frac{-1}{(1+x)^2}\right) dx.$$

$$\Rightarrow \quad e^x\left(\frac{1}{1+x}\right) + c. \ \#$$

Question 21.

given that $\Rightarrow$.

$$x\frac{dy}{dx} + 2y = x^2.$$

to find $\Rightarrow$ general solution of the equation

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$$x\frac{dy}{dx} + 2y = x^2.$$

dividing the equation by x →

$$\frac{\cancel{x}}{\cancel{x}}\frac{dy}{dx} + \frac{2y}{x} = \frac{x^{\cancel{2}}}{\cancel{x}}$$

$$\frac{dy}{dx} + \frac{2}{x}\cdot y = x.$$

$$P = \frac{2}{x} \text{ and } Q = x.$$

Integrating factor → $e^{\int \frac{2}{x}dx} = e^{2\log x} = e^{\log x^2} = x^2.$

formulae →.

$$y\,(I.f.) = \int (I.f.)\,Q\,dx. + C$$

$$y\cdot x^2 = \int x^2\cdot x\;dx + c$$

$$y\cdot x^2 = \int x^3\,dx + c$$

$$y\cdot x^2 = \frac{x^4}{4} + c.$$

dividing by x^2.

$$\frac{y\cdot \cancel{x^2}}{\cancel{x^2}} = \frac{x^{\cancel{4}}}{4\cdot \cancel{x^2}} + \frac{c}{x^2}. \;=\; y = \frac{x^2}{4} + Cx^{-2}$$ Ans.

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Question 22. (or)

given that →

$$\vec{r} = \hat{i} + 2\hat{j} + \hat{k} + \lambda(\hat{i} - \hat{j} + \hat{k}).$$

$$\vec{r} = 2\hat{i} - \hat{j} - \hat{k} + \mu(2\hat{i} + \hat{j} + 2\hat{k}).$$

To find →. shortest distance between the lines find →.

we know that →.

$$\text{Shortest distance.} = \left| \frac{(\vec{b_1} \times \vec{b_2}) \cdot (\vec{a_2} - \vec{a_1})}{|\vec{b_1} \times \vec{b_2}|} \right|$$

$$\vec{b_1} = \hat{i} - \hat{j} + \hat{k}.$$

$$\vec{b_2} = 2\hat{i} + \hat{j} + 2\hat{k}.$$

$$\vec{b_1} \times \vec{b_2} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & -1 & 1 \\ 2 & 1 & 2 \end{vmatrix}$$

$$= \hat{i}(-2-1) - \hat{j}(2-2) + \hat{k}(1+2).$$

$$= \hat{i}(-3) - \hat{j}(0) + \hat{k}(3).$$

$$= -3\hat{i} + 3\hat{k}.$$

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$$\vec{b}_1 \times \vec{b}_2 = -3\hat{i} + 3\hat{k}.$$

$$|\vec{b}_1 \times \vec{b}_2| = \sqrt{(-3)^2+(3)^2} = \sqrt{9+9}. = \sqrt{18}.$$

$\vec{a}_2 - \vec{a}_1$ $\quad \vec{a}_1 = \hat{i} + 2\hat{j} + \hat{k}.$

$$\vec{a}_2 = 2\hat{i} - \hat{j} - \hat{k}.$$

$$\vec{a}_2 - \vec{a}_1 = (2\hat{i} - \hat{j} - \hat{k}) - (\hat{i} + 2\hat{j} + \hat{k}).$$

$$\vec{a}_2 - \vec{a}_1 = 2\hat{i} - \hat{j} - \hat{k} - \hat{i} - 2\hat{j} - \hat{k}.$$

$$\vec{a}_2 - \vec{a}_1 = \hat{i} - 3\hat{j} - 2\hat{k}.$$

Now $\Rightarrow$. $\left| \dfrac{(\vec{b}_1 \times \vec{b}_2)\cdot(\vec{a}_2 - \vec{a}_1)}{\vec{b}_1 \times \vec{b}_2} \right|$

$$\Rightarrow \left| \frac{(-3\hat{i} + 3\hat{k})\cdot(\hat{i} - 3\hat{j} - 2\hat{k})}{\sqrt{18}} \right|$$

$$= \left| \frac{-3-6}{\sqrt{18}} \right|$$

$$= \left| \frac{-9}{\sqrt{18}} \right| = \frac{\cancel{9}\,3}{\cancel{3}\sqrt{2}} = \frac{3}{\sqrt{2}} \text{ ans.}$$

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Question 23. [or].

given that →:

$$f(x) = \begin{cases} \dfrac{K\cos x}{\pi - 2x}, & \text{if } x \neq \dfrac{\pi}{2} \\ 3, & \text{if } x = \dfrac{\pi}{2}. \end{cases}$$

$f(x)$ is continous at $\frac{\pi}{2}$.

to find → value of K for the function to be continous at $\frac{\pi}{2}$.

find →.

at $\frac{\pi}{2}$.

$f(x) \Rightarrow$

$f\left(\frac{\pi}{2}\right.$ $f(x) = 3.$

$f\left(\frac{\pi}{2}\right) = 3.$

B S E

योग पृष्ठ

मध्यप्रदेश

प्रश्न क्र.

B S E

L.H.L.

$$\lim_{x \to \frac{\pi}{2}^-} f(x)$$

$$\lim_{x \to \frac{\pi}{2}^-} \frac{K\cos x}{\pi - 2x}.$$

$$\lim_{h \to 0^-} \frac{K\cos\left(\frac{\pi}{2} - h\right)}{\pi - 2\left(\frac{\pi}{2} - h\right)}$$

$$\lim_{h \to 0^-} \frac{K\sin h}{\cancel{\pi} - \cancel{\pi} + 2h}.$$

$$\lim_{h \to 0^-} \frac{K\sin h}{2h}. \qquad \left[\because \lim_{h \to 0} \frac{\sin h}{h} = 1.\right]$$

$$\lim_{h \to 0^-} \frac{K}{2}$$

Now,

R.H.L.

$$\lim_{x \to \frac{\pi}{2}^+} f(x).$$

(28) + [ ] =
पृष्ठ 28 के अंक   कुल अंक

प्रश्न क्र.

$$\lim_{x \to \frac{\pi}{2}^+} \frac{k \cos x}{\pi - 2x}$$

$$\lim_{h \to 0^+} \frac{k \cos\left(\frac{\pi}{2} + h\right)}{\pi - 2\left(\frac{\pi}{2} + h\right)}$$

$$\lim_{h \to 0^+} \frac{-k \sin h}{\cancel{\pi} - \cancel{\pi} - 2h}$$

$$\lim_{h \to 0^+} \frac{\cancel{+} k \sin h}{\cancel{-} 2h} \quad \left[\because \lim_{h \to 0^+} \frac{\sin h}{h} = 1\right]$$

$$\lim_{h \to 0^+} \frac{k}{2}$$

As, per question. ~~A~~
It is given that at $x = \frac{\pi}{2}$, $f(x)$ is continous so,

$$f\left(\frac{\pi}{2}\right) = \lim_{x \to \frac{\pi}{2}^-} f(x) = \lim_{x \to \frac{\pi}{2}^+} f(x)$$

प्रश्न क्र.

$$3 = \frac{K}{2} = \frac{K}{2}$$

$$\frac{K}{2} = 3$$

$$\boxed{K = 6}$$

for $\boxed{K = 6}$ the function defined by $f(x) = \begin{cases} \frac{K\cos x}{\pi - 2x}, & \text{if } x \neq \frac{\pi}{2} \\ 3, & \text{if } x = \frac{\pi}{2} \end{cases}$

is continous at $\frac{\pi}{2}$.

Question 17.

$Z = 3x + 4y.$

$x + y \leq 4.$

$x + y = 4$

x	0	4.
y	4	0

zero test

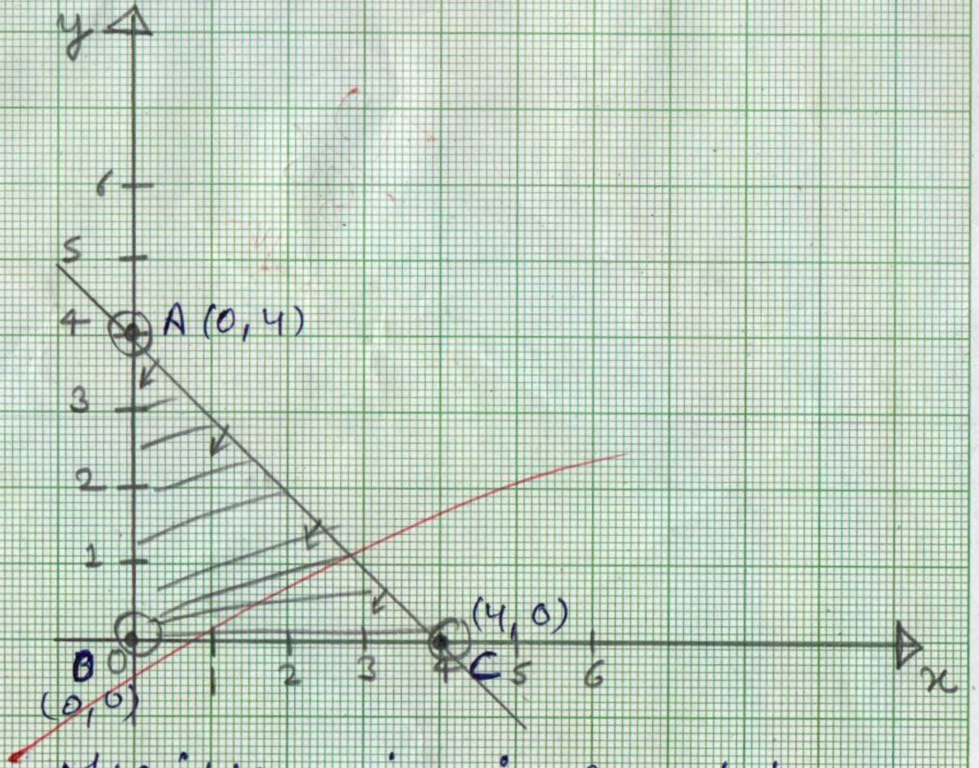
$x + y \leq 4$

$0 \leq 4.$

(True) towards origin

- $x \geq 0$ & $y \geq 0$ means first quadrant.

graph. →



Feasible region is Bounded A O C.

Corner points	$Z = 3x + 4y$
O (0, 0)	0
A (0, 4)	16 ⇐
B (4, 0)	12.

maximum value of $Z = 3x+4y$ is 16 at point (0,4) A.