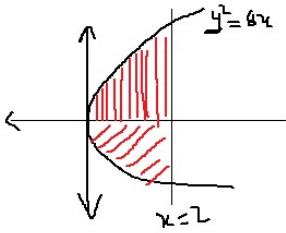
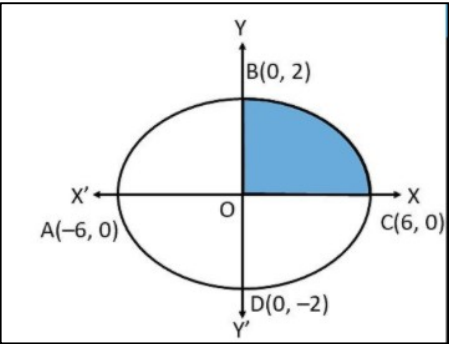


VALUE POINTS OF PRACTICE PAPER – 1 (2020-21)

CLASS XII
MATHEMATICS

<u>S.NO.</u>	<u>OBJECTIVE TYPE QUESTIONS</u> <u>(SECTION – I)</u>	<u>MARKS</u>
1.	$\frac{\pi}{4}$	1
2.	$\frac{1}{36}$	1
3.	x = 3	1
4.	0	1
5.	$\frac{16}{3}$ sq.units OR F(x) = x – 1 + x – 2 (Or any Correct Response)	1 1
6.	3	1
7.	1 unit	1
8.	$\frac{1}{x^2}$	1
9.	0 OR $f(x) = x.e^x$	1 1
10.	11	1
11.	$\frac{1}{15}$	1
12.	$I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ OR m + n = 1	1 1
13.	(1, 0, 0)	1
14.	2 OR 0	1 1
15.	1 OR 3	1 1
16.	$\frac{1}{\sqrt{7}}$	1
	SECTION – II	
17. (i)	(d)	1
17. (ii)	(c)	1
17. (iii)	(b)	1
17. (iv)	(c)	1
17. (v)	(a)	1

18. (i)	(d)	1
18. (ii)	(c)	1
18. (iii)	(c)	1
18. (iv)	(d)	1
18. (v)	(c)	1
SECTION – III		
19.	<p>Reflexive : Since, $a+a=2a$, which is even $\therefore (a,a) \in R \forall a \in Z$ Hence R is reflexive</p> <p>Symmetric: If $(a,b) \in R$, then $a+b = 2\lambda \Rightarrow b+a = 2\lambda \Rightarrow (b,a) \in R$, Hence R is symmetric</p> <p>Transitive: If $(a,b) \in R$ and $(b,c) \in R$ then $a+b = 2\lambda$ --- (1) and $b+c = 2\mu$ --- (2) Adding (1) and (2) we get $a+2b+c=2(\lambda + \mu) \Rightarrow a+c=2(\lambda + \mu - b) \Rightarrow a+c=2k$, where $\lambda + \mu - b = k$ $\Rightarrow (a,c) \in R$, Hence R is transitive</p>	<p>½</p> <p>½</p> <p>1</p>
20.	<p>NO. OF REFLEXIVE RELATIONS = $2^6 = 64$</p> <p>NO. OF SYMMETRIC RELATIONS = $2^3 = 8$</p>	<p>1</p> <p>1</p>
21.	<p><i>Cartesian Equation</i>: $\frac{x-4}{-1} = \frac{y-7}{-2} = \frac{z-1}{2}$</p> <p><i>Vector Equation</i>: $\vec{r} = (4\hat{i} + 7\hat{j} + \hat{k}) + \lambda(-\hat{i} - 2\hat{j} + 2\hat{k})$</p> <p style="text-align: center;">OR</p> <p>The given lines can be written as:</p> <p>$\frac{x-q}{p} = \frac{y-0}{1} = \frac{z-s}{r}$ and $\frac{x-q'}{p'} = \frac{y-0}{1} = \frac{z-s'}{r'}$</p> <p>As lines are perpendicular then $pp' + rr' + 1 = 0$.</p>	<p>1</p> <p>1</p> <p>1 ½</p> <p>½</p>
22.	<p>$\vec{a} = \hat{i} - \hat{j} + 3\hat{k}$ and $\vec{b} = 2\hat{i} - 7\hat{j} + \hat{k}$</p> <p>$\vec{a} \times \vec{b} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & -1 & 3 \\ 2 & -7 & 1 \end{vmatrix} = 20\hat{i} + 5\hat{j} - 5\hat{k}$</p> <p>Area of parallelogram = $\frac{1}{2} \vec{a} \times \vec{b} = \frac{1}{2} \sqrt{400 + 25 + 25} = \frac{15}{2} \sqrt{2}$ sq.units</p> <p style="text-align: center;">OR</p> <p>As, Each one of them being perpendicular to the sum of other two</p> <p>$2(\vec{a} \cdot \vec{b} + \vec{c} \cdot \vec{a} + \vec{b} \cdot \vec{c}) = 0$</p> <p>and</p> <p>$\vec{a} + \vec{b} + \vec{c} ^2 = (\vec{a} + \vec{b} + \vec{c}) \cdot (\vec{a} + \vec{b} + \vec{c})$ $= \vec{a} ^2 + \vec{b} ^2 + \vec{c} ^2 + 2(\vec{a} \cdot \vec{b} + \vec{c} \cdot \vec{a} + \vec{b} \cdot \vec{c})$ $= 9 + 16 + 25 + 0 = 50$</p> <p>$\vec{a} + \vec{b} + \vec{c} = 5\sqrt{2}$</p>	<p>1</p> <p>1</p> <p>½</p> <p>1</p> <p>½</p>
23.	<p>$f'(x) = 4x(x-1)(x-2)$</p> <p>so, $f(x)$ is increasing for $x \in [0, 1] \cup [2, \infty)$</p>	<p>1</p> <p>1</p>

24.	$I = \int \frac{dx}{(x-2)^2 - 1^2} = \frac{1}{2} \log \left \frac{x-2-1}{x-2+1} \right + c$ $I = \frac{1}{2} \log \left \frac{x-3}{x-1} \right + c$	<p>$\frac{1}{2} + 1$</p> <p>$\frac{1}{2}$</p>
25.	$\frac{dy}{d\theta} = a\theta \sin \theta, \frac{dx}{d\theta} = a\theta \cos \theta$ $\frac{dy}{dx} = \frac{a\theta \sin \theta}{a\theta \cos \theta} = \tan \theta$	<p>1</p> <p>1</p>
26.	<p>As $(10, 3) \in R, (3, 2) \in R$ but $(10, 2) \notin R$ so, R is not Transitive. (OR Any Correct Response)</p> <p style="text-align: center;">OR</p> <p>Let, $f(x) = f(y) \Rightarrow \frac{2x-4}{3x-9} = \frac{2y-4}{3y-9} \Rightarrow x = y$</p> <p>So, $f(x)$ is one-one function.</p> <p>Let, $y = f(x) = \frac{2x-4}{3x-9} \Rightarrow x = \frac{9y-4}{3y-2}$</p> <p>As, Range = Codomain thus, $f(x)$ is onto function. So, $f(x)$ is Bijective Function.</p>	<p>1 ½</p> <p>½</p> <p>½</p> <p>1</p> <p>½</p>
27.	$I = \int_0^{\frac{\pi}{2}} \frac{\sin x}{\sin x + \cos x} dx = \int_0^{\frac{\pi}{2}} \frac{\cos x}{\cos x + \sin x} dx$ $2I = \int_0^{\frac{\pi}{2}} \frac{\sin x + \cos x}{\sin x + \cos x} dx = \int_0^{\frac{\pi}{2}} 1 dx = \frac{\pi}{2}$ $I = \frac{\pi}{4}$	<p>½</p> <p>1</p> <p>½</p>
28.	$A = 2 \int_0^2 2\sqrt{2}\sqrt{x} \cdot dx = \frac{4\sqrt{2}}{3} (x^{\frac{3}{2}})_0^2$ $A = \frac{32}{3} \text{ sq. units}$	 <p>1 ½</p> <p>1/2</p>
SECTION - IV		
29.	<p>Area of Ellipse = 4 (Area of BOC)</p> $A = 4 \int_0^6 \frac{1}{3} \sqrt{6^2 - x^2} \cdot dx =$ $A = \frac{4}{3} \left(\frac{x}{2} \sqrt{6^2 - x^2} + \frac{36}{2} \sin^{-1} \left(\frac{x}{6} \right) \right)_0^6$ $A = 12\pi \text{ sq. units}$	 <p>$\frac{1}{2} + \frac{1}{2}$ (FOR FIGURE)</p> <p>1</p> <p>1</p>

30.

Let the Events be

 E_1 : Choosing 1st Coin E_2 : Choosing 2nd Coin E_3 : Choosing 3rd Coin

A: Getting Heads

$$P(E_1) = P(E_2) = P(E_3) = \frac{1}{3}$$

$$P\left(\frac{A}{E_1}\right) = \frac{40}{100}, P\left(\frac{A}{E_2}\right) = \frac{75}{100}, P\left(\frac{A}{E_3}\right) = \frac{1}{2}$$

$$P\left(\frac{E_3}{A}\right) = \frac{\frac{1}{3} \cdot \frac{1}{2}}{\frac{1}{3} \left(\frac{40+75+50}{100}\right)} = \frac{50}{165} = \frac{10}{33}$$

OR

Let X represents the number of defective bulbs drawn.

∴ X can take values 0,1 ,2, 3 or 4

PROBABILITY DISTRIBUTION

$$P(X=0) = \left(\frac{6}{10} \cdot \frac{5}{9} \cdot \frac{4}{8} \cdot \frac{3}{7}\right) = \frac{360}{5040}$$

$$P(X=1) = 4 \left(\frac{6}{10} \cdot \frac{5}{9} \cdot \frac{4}{8} \cdot \frac{4}{7}\right) = \frac{1920}{5040}$$

$$P(X=2) = 6 \left(\frac{6}{10} \cdot \frac{5}{9} \cdot \frac{4}{8} \cdot \frac{3}{7}\right) = \frac{2160}{5040}$$

$$P(X=3) = 4 \left(\frac{6}{10} \cdot \frac{4}{9} \cdot \frac{3}{8} \cdot \frac{2}{7}\right) = \frac{576}{5040}$$

$$P(X=4) = 1 \left(\frac{4}{10} \cdot \frac{3}{9} \cdot \frac{2}{8} \cdot \frac{1}{7}\right) = \frac{24}{5040}$$

X	P(X)
0	$\frac{360}{5040}$
1	$\frac{1920}{5040}$
2	$\frac{2160}{5040}$
3	$\frac{576}{5040}$
4	$\frac{24}{5040}$
TOTAL	1

1

1

1

 $\frac{1}{2}$

2½

31.

Two dice are thrown together i.e.,

∴ $n(S) = 36$, where S is the sample space.Event ' E ' is 'a total of 4'∴ $E = \{(2, 2), (3, 1), (1, 3)\}$ Event ' F ' is 'a total of 9 or more'∴ $F = \{(3, 6), (6, 3), (4, 5), (5, 4), (4, 6), (6, 4), (5, 5), (5, 6), (6, 5), (6, 6)\}$ Event ' G ' is 'a total divisible by 5'∴ $G = \{(1, 4), (4, 1), (2, 3), (3, 2), (4, 6), (6, 4), (5, 5)\}$ Here, $(E \cap F) = \phi$ and $(E \cap G) = \phi$ Also, $(F \cap G) = \{(4, 6), (6, 4), (5, 5)\}$

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{3}{36} = \frac{1}{12}$$

$$P(F) = \frac{n(F)}{n(S)} = \frac{10}{36} = \frac{5}{18}$$

$$P(G) = \frac{n(G)}{n(S)} = \frac{7}{36}$$

$$P(F \cap G) = \frac{3}{36} = \frac{1}{12}$$

$$\text{and } P(F) \cdot P(G) = \frac{5}{18} \cdot \frac{7}{36} = \frac{35}{648}$$

So, $P(F \cap G) \neq P(F) \cdot P(G)$

Hence, there is no pair which is independent.

1

1

1

<p>32.</p>	<p>The function $f(x)=2x- x$ can be written as $f(x)=\begin{cases} 3x, & x \leq 0 \\ x, & x > 0. \end{cases}$</p> <p>Now, $\lim_{x \rightarrow 0^-} f(x) = 0.$ And, $\lim_{x \rightarrow 0^+} f(x) = 0.$ $f(0) = 0$ So we've, $LHL = RHL = f(x=0)$, Thus the function $f(x)$ is continuous at $x = 0.$</p> <p>We observe $LHD = 3$, $RHD = 1$ thus LHD is not equal to RHD, thus $f(x)$ is not differentiable at $x = 0.$</p> <p style="text-align: center;">OR</p> $y = \cot^{-1}\left(\cot \frac{x}{2}\right) = \frac{x}{2}$ $\frac{dy}{dx} = \frac{1}{2}$	<p style="text-align: right;">1 ½</p> <p style="text-align: right;">1 ½</p> <p style="text-align: right;">2</p> <p style="text-align: right;">1</p>
<p>33.</p>	$\frac{dy}{dx} + \frac{1}{x \log x} y = \frac{2}{x^2}$ <p><i>Integrating factor</i> = $\log x$</p> <p>so, solution of given differential equation is,</p> $y \cdot \log x = \int \frac{2}{x^2} \log x \, dx$ $y \cdot \log x = \frac{-2}{x} (1 + \log x) + c$	<p style="text-align: right;">1</p> <p style="text-align: right;">1</p> <p style="text-align: right;">1</p>
<p>34.</p>	$\frac{dy}{dx} = \frac{-b}{a} \cot \theta$ <p>so, slope of tangent = $\frac{-b}{a}$</p> <p>Slope of Normal = $\frac{a}{b}$</p> <p>Equation of Tangent: $\sqrt{2}(bx + ay) = ab$ Equation of Normal: $2\sqrt{2}(by - ax) = b^2 - a^2$</p>	<p style="text-align: right;">1½</p> <p style="text-align: right;">1½</p>
<p>35.</p>	$I = \int_{-1}^2 x^3 - x \, dx = \int_{-1}^0 (x^3 - x) \, dx + \int_0^1 (x - x^3) \, dx + \int_1^2 (x^3 - x) \, dx$ $I = \left[\frac{x^4}{4} - \frac{x^2}{2} \right]_{-1}^0 - \left[\frac{x^4}{4} - \frac{x^2}{2} \right]_0^1 + \left[\frac{x^4}{4} - \frac{x^2}{2} \right]_1^2$ $I = \frac{11}{4}$ <p style="text-align: center;">OR</p> <p>Let, $\frac{x+1}{(x+3)(x^2+4)} = \frac{A}{x+3} + \frac{Bx+C}{x^2+4}$</p> <p>On solving we get, $A = \frac{-2}{13}, B = \frac{2}{13}, C = \frac{7}{13}$</p>	<p style="text-align: right;">1</p> <p style="text-align: right;">2</p> <p style="text-align: right;">1 ½</p>

	$I = \frac{-2}{13} \log(x+3) + \frac{1}{13} \log(x^2+4) + \frac{7}{26} \tan^{-1}\left(\frac{x}{2}\right) + C$	1 ½
SECTION - V		
36.	$A^{-1} = \frac{1}{18} \begin{bmatrix} 1 & 7 & -5 \\ -5 & 1 & 7 \\ 7 & -5 & 1 \end{bmatrix}$ <p>Then $X = A^{-1}B = \frac{1}{18} \begin{bmatrix} 1 & 7 & -5 \\ -5 & 1 & 7 \\ 7 & -5 & 1 \end{bmatrix} \begin{bmatrix} 6 \\ 6 \\ 6 \end{bmatrix} = \frac{1}{18} \begin{bmatrix} 18 \\ 18 \\ 18 \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$</p> <p>Thus, $x=1, y=1, z=1$</p> <p style="text-align: center;">OR</p> $A^{-1} = \frac{1}{-4} \begin{bmatrix} 7 & 8 & -3 \\ 6 & 4 & -2 \\ -5 & -4 & 1 \end{bmatrix}$ $X = (A^T)^{-1}B = (A^{-1})^T B = \frac{1}{-4} \begin{bmatrix} 7 & 6 & -5 \\ 8 & 4 & -4 \\ -3 & -2 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 4 \\ 7 \end{bmatrix} = \frac{1}{-4} \begin{bmatrix} -4 \\ -4 \\ -4 \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$ <p>Thus, $x=1, y=1, z=1$</p>	<p>2</p> <p>2½</p> <p>½</p> <p>2</p> <p>2 ½</p> <p>½</p>
37.	<p>Let the required equation of plane passing through the intersection of planes $x + 3y + 6 = 0$ and $3x - y - 4z = 0$ be</p> $(x + 3y + 6) + \lambda(3x - y - 4z) = 0 \quad \dots(i)$ <p>Above equation can be written as</p> $x + 3y + 6 + 3\lambda x - \lambda y - 4\lambda z = 0$ $\text{or } x(1 + 3\lambda) + y(3 - \lambda) - 4\lambda z + 6 = 0 \quad \dots(ii)$ <p>which is the general form of equation of plane.</p> <p>Also, given that perpendicular distance of plane (i) from origin, i.e., $(0, 0, 0)$ is unity, i.e., one.</p> $\therefore \left[\frac{(1+3\lambda).(0) + (3-\lambda)(0) - 4\lambda(0) + 6}{\sqrt{(1+3\lambda)^2 + (3-\lambda)^2 + (-4\lambda)^2}} \right] = 1$ $\left[\because \text{distance of point } (x_1, y_1, z_1) \text{ from a plane } ax + by + cz + d = 0 \text{ is given by } d = \frac{ ax_1 + by_1 + cz_1 + d }{\sqrt{a^2 + b^2 + c^2}} \right]$ <p>here, $a = 1 + 3\lambda, b = 3 - \lambda, c = -4\lambda,$ $(x_1, y_1, z_1) = (0, 0, 0)$</p>	2

$$\text{or } \left| \frac{6}{\sqrt{1+9\lambda^2+6\lambda+9+\lambda^2-6\lambda+16\lambda^2}} \right| = 1$$

$$\text{or } \frac{6}{\sqrt{26\lambda^2+10}} = 1 \text{ or } 6 = \sqrt{26\lambda^2+10}$$

On squaring both sides, we get

$$36 = 26\lambda^2 + 10$$

$$\text{or } 26\lambda^2 = 26 \text{ or } \lambda^2 = 1 \text{ or } \lambda = \pm 1$$

Now, on putting $\lambda = \pm 1$ in Eq, (i), we get

$$x + 3y + 6 - 3x + y + 4z = 0$$

$$\text{or } -2x + 4y + 4z + 6 = 0$$

$$\text{or } x - 2y - 2z - 3 = 0 \text{ [divide by } -2] \dots(\text{iv})$$

Hence, required equations of the plane are

$$2x + y - 2z + 3 = 0 \text{ and } x - 2y - 2z - 3 = 0$$

OR

$$2x = y = z$$

$$\text{or } \frac{x}{1/2} = \frac{y}{1} = \frac{z}{1}$$

Direction ratios of this line are $\left(\frac{1}{2}, 1, 1\right)$

\therefore Line parallel to this line and passing through

$$(3, 4, 5) \text{ is } \frac{x-3}{1/2} = \frac{y-4}{1} = \frac{z-5}{1} = k \text{ (let)}$$

$$\text{or } x = 3 + \frac{k}{2}, y = 4 + k, z = 5 + k$$

Substituting in the plane $x + y + z = 2$, we get

$$3 + \frac{k}{2} + 4 + k + 5 + k = 2$$

$$\text{or } 12 + \frac{5k}{2} = 2$$

$$\text{or } 5k = -10 \times 2$$

$$\text{or } k = -4$$

Point of intersection is :

$$\left(3 - \frac{4}{2}, 4 - 4, 5 - 4\right) = (1, 0, 1)$$

$$\therefore \text{Distance} = \sqrt{(3-1)^2 + (4-0)^2 + (5-1)^2}$$

$$= \sqrt{4 + 16 + 16}$$

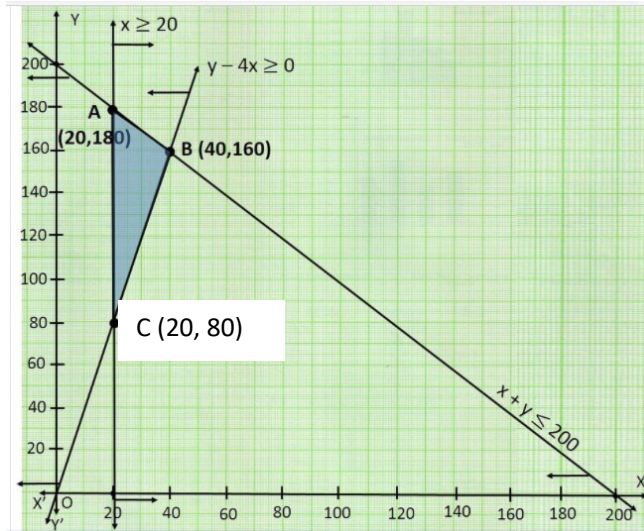
$$= 6 \text{ units}$$

38.

Corner points are
A(20,180), B(40, 160) and C(20, 80)

Z at A = 1,88,000
Z at B = 1,76,000
Z at C = 88,000

SO maximum Z = 1,88,000
At x = 20 and y = 180



OR

(i)

Corner points	$Z = 3x - 4y$
O(0,0)	0
A(0,8)	-32
B(4,10)	-28
C(6,8)	-14
D(6,5)	-2
E(4,0)	12

Max Z = 12 at E(4,0) Min Z = -32 at A(0,8)

(ii) Since maximum value of Z occurs at B(4,10) and C(6, 8)

$$\therefore 4p + 10q = 6p + 8q \Rightarrow 2q = 2p \Rightarrow p = q$$

Number of optimal solution are infinite

1 ½

1

2

½