

## assignment -2

Source

Rich Text

```
1 \documentclass{beamer}
2 \usepackage[utf8]{inputenc}
3 \usepackage[framemethod=tikz]{mdframed}
4 \usepackage{graphicx}
5 \usetheme{JuanLesPins}
6 \usecolortheme{crane}
7
8
9 \title{Assignment-2}
10 \author{Swasti Bhardwaj}
11 \institute{Mata Sundri College For Women \ \ Delhi University}
12 \date{14 October '2021}
13
14 \begin{document}
15
16 \begin{frame}
17 \frametitle{\centerline{Assignment-2}}
18 %\titlepage
19 \begin{block}{\centerline{Presentation}}
20 \end{block}
21 \underline{Name} - Swasti Bhardwaj\ \
22 \underline{College} - Mata Sundri College for Women \ \
23 \quad\quad\quad Delhi University\ \
24 \underline{Roll no.} - MAT/20/125\ \
25 \underline{University Roll no.} - 20044563050
26 \end{frame}
27
28 \begin{frame}
29 \frametitle{\centerline{Content of page 69}}
```

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30 - \begin{block}{1.}
31 | | Let  $x = (x_1, \dots, x_n)$ , where the  $x_i$  are non-negative real numbers. Set
32 |  $M_r(x) = \left( \frac{x_1^r + x_2^r + \dots + x_n^r}{n} \right)^{1/r}$ ,  $r \in \mathbb{R} \setminus \{0\}$  and
33 |  $M_0(x) = (x_1 x_2 \dots x_n)^{1/n}$ .
34 | We call  $M_r(x)$  the  $r$ th power mean of  $x$ .
35 | Claim:  $\lim_{r \rightarrow 0} M_r(x) = M_0(x)$ .
36 | \end{block}
37 \end{frame}
38
39 - \begin{frame}
40 \frametitle{\centerline{Content of page 69}}
41 - \begin{block}{2.}
42 | Define
43 |  $V_n = \begin{bmatrix} 1 & 1 & 1 & \dots & 1 \\ x_1 & x_2 & x_3 & \dots & x_n \\ x_1^2 & x_2^2 & x_3^2 & \dots & x_n^2 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ x_1^{n-1} & x_2^{n-1} & x_3^{n-1} & \dots & x_n^{n-1} \end{bmatrix}$ 
44 | We call  $V_n$  the Vandermonde matrix of order  $n$ .
45 | Claim:
46 |  $\det V_n = \prod_{1 \leq i < j \leq n} (x_j - x_i)$ .
47 \end{block}
48 \end{frame}
49 - \begin{frame}
50 \frametitle{\centerline{Question 4 [ Part-1 ]}}
51 \begin{mdframed}
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58 \[ 3^3+4^3+5^3=6^3\]
59 \end{mdframed}
60 \begin{mdframed}
61 \[ \sqrt{100}=10\]
62 \end{mdframed}
63 \begin{mdframed}
64 \[ (a+b)^3=a^3+3a^2b+3ab^2+b^3\]
65 \end{mdframed}
66 \begin{mdframed}
67 $$ \sum_{k=1}^n k = \frac{n(n+1)}{2} $$
68 \end{mdframed}
69 \begin{mdframed}
70 $$ \frac{\pi}{4} = \frac{1}{1} - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \dots $$
71 \end{mdframed}
72 \end{frame}
73
74
75 \begin{frame}
76 \frametitle{\centerline{Question 4 [ Part-2 ]}}
77 \begin{mdframed}
78 \[ \cos\theta = \sin(90^\circ - \theta) \]
79 \end{mdframed}
80 \begin{mdframed}
81 \[ e^{i\theta} = \cos\theta + i\sin\theta \]
82 \end{mdframed}
83 \begin{mdframed}
84 \[ \lim_{\theta \rightarrow 0} \frac{\sin\theta}{\theta} = 1 \]
85 \end{mdframed}

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86 ▾ \begin{mdframed}
87 $$$ \lim_{x \rightarrow \infty} \frac{\pi x}{x/\log x}=1$$$
88 \end{mdframed}
89 ▾ \begin{mdframed}
90 $$$ \int_{-\infty}^{\infty} e^{-x^2} dx=\sqrt{\pi} $$$
91 \end{mdframed}
92 \end{frame}
93
94 ▾ \begin{frame}
95 \frametitle{\centerline{Question-5 [ Part-1 ]}}
96 ▾ \begin{mdframed}
97 | Positive numbers $a,b,$ and $c$ are the side lengths of a triangle if and only if $a+b>c,b+c>a,$ and $c+a>b.$
98 \end{mdframed}
99 ▾ \begin{mdframed}
100 | The area of a triangle with side lengths $a,b,c$ is given by Heron's formula:
101 | \[ A = \sqrt{s(s-a)(s-b)(s-c)} , \]
102 | where $s$ is the semiperimeter $(a+b+c)/2.$
103 \end{mdframed}
104 ▾ \begin{mdframed}
105 | The volume of a regular tetrahedron of edge length 1 is $\sqrt{2}/12.$
106 \end{mdframed}
107 \end{frame}
108
109 ▾ \begin{frame}
110 \frametitle{\centerline{Question-5 [ Part-2 ]}}
111 ▾ \begin{mdframed}
112 | The quadratic equation $ax^2+bx+c=0$ has roots
113 | \[r_1,r_2=\frac{-b\pm \sqrt{b^2-4ac}}{2a}.\]

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114 | \end{mdframed}
115 | \begin{mdframed}
116 | | The derivative of a function  $f$ , denoted  $f'$ , is defined by
117 | | 
$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}.$$

118 | | \end{mdframed}
119 | | \begin{mdframed}
120 | | | A real-valued function  $f$  is convex on an interval  $I$  if
121 | | | 
$$f(\lambda x + (1-\lambda)y) \leq \lambda f(x) + (1-\lambda)f(y),$$

122 | | | for all  $x, y \in I$  and  $0 \leq \lambda \leq 1$ .
123 | | | \end{mdframed}
124 | \end{frame}
125 |
126 | \begin{frame}
127 | \frametitle{\centerline{Question-5 [ Part-3 ]}}
128 | | \begin{mdframed}
129 | | | The general solution to the differential equation
130 | | | 
$$[y'' - 3y' + 2y = 0]$$

131 | | | is
132 | | | 
$$[y = C_1 e^x + C_2 e^{2x}].$$

133 | | | \end{mdframed}
134 | | \begin{mdframed}
135 | | | The Fermat number  $F_n$  is defined as
136 | | | 
$$[F_n = 2^{2^n}, n \geq 0.]$$

137 | | | \end{mdframed}
138 | \end{frame}
139 |
140 | \begin{frame}

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141 \frametitle{\centerline{Question 6 [ Part-1 ]}}
142 \begin{mdframed}
143 \left[\frac{d}{dx}\left(\frac{x}{x+1}\right)=\frac{1}{(x+1)^2}\right]
144 \end{mdframed}
145 \begin{mdframed}
146 \left[\lim_{n\rightarrow\infty}\left(1+\frac{1}{n}\right)^n=e\right]
147 \end{mdframed}
148 \begin{mdframed}
149 \left[\begin{array}{cc}
150 a&b\\c&d
151 \end{array}\right]=ad-bc \left]
152 \end{mdframed}
153 \begin{mdframed}
154 \left[R_\theta = \left[\begin{array}{cc}
155 \cos\theta&-\sin\theta\\
156 \sin\theta&\cos\theta
157 \end{array}\right]\right]
158 \end{mdframed}
159 \end{frame}
160
161 \begin{frame}
162 \frametitle{\centerline{Question 6 [ Part-2 ]}}
163 \begin{mdframed}
164 \left[\begin{array}{ccc}
165 \textbf{i}&\textbf{j}&\textbf{k} \\
166 a_1&a_2&a_3 \\
167 b_1&b_2&b_3
168 \end{array}\right]=\left[\begin{array}{cc}

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169      a_2&a_3\\
170      b_2&b_3
171      \end{array}\right| \textbf{i}-\left|\begin{array}{cc}
172      a_1&a_3\\
173      b_1&b_3
174      \end{array}\right| \textbf{j}+\left|\begin{array}{cc}
175      a_1&a_2\\
176      b_1&b_2
177      \end{array}\right| \textbf{k} \ ]
178 \end{mdframed}\bigskip
179 \framebox(320,50)
180 { \left[\begin{array}{cc}
181 a_{11}&a_{12}\\
182 a_{21}&a_{22}
183 \end{array}\right]\left[\begin{array}{cc}
184 b_{11}&b_{12}\\
185 b_{21}&b_{22}
186 \end{array}\right]=\left[\begin{array}{cc}
187 a_{11}b_{11}+a_{12}b_{21}&a_{11}b_{12}+a_{12}b_{22}\\
188 a_{21}b_{11}+a_{22}b_{21}&a_{21}b_{12}+a_{22}b_{22}
189 \end{array}\right]\ ] }
190 \begin{mdframed}
191 \left[\left\{\begin{array}{l}
192 -x^2 ,& x<0\\
193 x^2 ,& 0\leq x\leq 2\\
194 4 ,& x>2
195 \end{array}\right\}\right]. \ ]

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196      \end{mdframed}
197 \end{frame}
198
199 \begin{frame}
200 \frametitle{\centerline{Question-7}}
201 \begin{block}{Part-1}
202 \begin{eqnarray*}
203 1+2&=&3 \\
204 4+5+6&=&7+8 \\
205 9+10+11+12&=&13+14+15 \\
206 16+17+18+19+20&=&21+22+23+24 \\
207 25+25+27+28+29+30&=&31+32+33+34+35
208 \end{eqnarray*}
209 \end{block}
210 \end{frame}
211
212 \begin{frame}
213 \frametitle{\centerline{Question-7}}
214 \begin{block}{Part-2}
215 \begin{eqnarray*}
216 (a+b)^2&=&(a+b)(a+b) \\
217 &=&(a+b)a+(a+b)b \\
218 &=&a(a+b)+b(a+b) \\
219 &=&a^2+ab+ba+b^2 \\
220 &=&a^2+ab+ab+b^2 \\
221 &=&a^2+2ab+b^2
222 \end{eqnarray*}
223 \end{block}
224 \end{frame}

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226 \begin{frame}
227 \frametitle{\centerline{Question-7}}
228 \begin{block}{Part-3}
229 \begin{eqnarray*}
230 \tan(\alpha+\beta+\gamma)&=&\frac{\tan(\alpha+\beta)+\tan(\gamma)}{1-\tan(\alpha+\beta)\tan\gamma} \\
231 &=&\frac{\frac{\tan\alpha+\tan\beta}{1-\tan\alpha\tan\beta}+\tan\gamma}{1-\left(\frac{\tan\alpha+\tan\beta}{1-\tan\alpha\tan\beta}\right)\tan\gamma} \\
232 &=&\frac{\tan\alpha+\tan\beta+(1-\tan\alpha\tan\beta)\tan\gamma}{1-\tan\alpha\tan\beta-(\tan\alpha+\tan\beta)\tan\gamma} \\
233 &=&\frac{\tan\alpha+\tan\beta+\tan\gamma-\tan\alpha\tan\beta\tan\gamma}{1-\tan\alpha\tan\beta-\tan\alpha\tan\gamma-\tan\beta\tan\gamma} \\
234 \end{eqnarray*}
235 \end{block}
236 \end{frame}
237
238 \begin{frame}
239 \frametitle{\centerline{Question-7}}
240 \begin{block}{Part-4}
241 \begin{eqnarray*}
242 \prod_p \left(1-\frac{1}{p^2}\right) &=& \prod_p \frac{1}{1+\frac{1}{p^2}+\frac{1}{p^4}+\cdots} \\
243 &=& \left(\prod_p \left(1+\frac{1}{p^2}+\frac{1}{p^4}+\cdots\right)\right)^{-1} \\
244 &=& \left(1+\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+\cdots\right)^{-1} \\
245 &=& \frac{6}{\pi^2} \\
246 \end{eqnarray*}
247 \end{block}
248 \end{frame}
249 \begin{frame}
250 \includegraphics[width=11cm,height=8cm]{ty.jpg}
251 \end{frame}
252 \end{document}

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