

```

1 \documentclass{beamer}
2 \usepackage[utf8]{inputenc}
3 \title{Assignment - 2}
4 \author{Kritika Mudgil \College Roll No.- MAT/20/101 \ University Roll No. - 20044563026}
5 \institute{Mata Sundri College for Women \ University of Delhi}
6 \date{}
7 \usepackage{gensymb}
8 \usepackage{xcolor}
9 \usepackage{graphicx}
10 \usetheme{Berlin}
11 \begin{document}
12 \begin{frame}
13   \titlepage
14 \end{frame}
15 \begin{itemize}
16 \begin{frame}{Content on Page No.69}
17
18   \item Let  $\mathbf{x} = (x_1, \dots, x_n)$ , where the  $x_i$  are non negative real numbers. Set
19   \[
20   M_r(\mathbf{x}) = \left(\frac{x_1^r + x_2^r + \dots + x_n^r}{n}\right)^{1/r}; \quad ; \quad r \in \mathbf{R} \setminus \{0\},
21   \]
22   and
23   \[
24   M_0(\mathbf{x}) = \left(x_1 x_2 \dots x_n\right)^{1/n}.
25   \]
26   we call  $M_r(\mathbf{x})$  the  $r$ th power mean of  $\mathbf{x}$ .
27
28   Claim:
29   \[
30   \lim_{r \rightarrow 0} M_r(\mathbf{x}) = M_0(\mathbf{x}).
31   \]
32
33 \end{frame}

```

File outline

We can't find any sections or subsections in this file. [Find out more about the file outline](#)

Source Rich Text

download 1.png

main.tex

```

31 | \]
32 |
33 | \end{frame}
34 | \begin{frame}{Content on Page No.69}
35 | \item Define
36 | \[
37 | v_n=
38 | \left[
39 | \begin{array}{cccc}
40 | 1 & 1 & 1 & \cdots & 1 \\
41 | x_1 & x_2 & x_3 & \cdots & x_n \\
42 | x_1^2 & x_2^2 & x_3^2 & \cdots & x_n^2 \\
43 | \vdots & \vdots & \vdots & \ddots & \vdots \\
44 | x_1^{n-1} & x_2^{n-1} & x_3^{n-1} & \cdots & x_n^{n-1}
45 | \end{array}
46 | \right]
47 | \]
48 | We call  $v_n$  the Vandermonde matrix of order  $n$ .
49 |
50 | Claim:
51 | \[
52 | \det v_n = \prod_{1 \leq i < j \leq n} (x_j - x_i).
53 | \]
54 | \end{frame}
55 | \end{itemize}
56 | \begin{enumerate}
57 | \begin{frame}{Question No.4}
58 | \item  $3^3 + 4^3 + 5^3 = 6^3$ 
59 | \item  $\sqrt{100} = 10$ 
60 | \item  $(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$ 
61 | \item  $\sum_{k=1}^n k = \frac{n(n+1)}{2}$ 
62 | \item \begin{eqnarray*}
63 | \frac{\pi^4}{4} = \frac{1}{1} - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \cdots

```

File outline

We can't find any sections or subsections in this file.

[Find out more about the file outline](#)

Source | Rich Text

download 1.png

main.tex

File outline

We can't find any sections or subsections in this file. Find out more about the file outline

```

62 \begin{equation}
63 \frac{\pi}{4} = \frac{1}{1} - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \dots
64 \end{equation}
65 \end{frame}
66 \begin{frame}{Remaining parts of Question No. 4}
67
68 \item  $\cos \theta = \sin(90^\circ - \theta)$ 
69  $e^{i\theta} = \cos \theta + i \sin \theta$ 
70  $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$ 
71  $\lim_{x \rightarrow \infty} \frac{\pi(x)}{x \log x} = 1$ 
72  $\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}$ 
73 \end{frame}
74 \end{enumerate}
75 \begin{itemize}
76 \begin{frame}{Question No.5}
77 \item Positive numbers  $a, b, c$  are the side lengths of a triangle if and only if  $a + b > c$ ,  $b + c > a$ , and  $c + a > b$ .
78 \item The area of a triangle with side lengths  $a, b, c$  is given by Heron's formula:
79  $A = \sqrt{s(s-a)(s-b)(s-c)}$ ,
80 where  $s$  is the semiperimeter  $(a+b+c)/2$ .
81 \item The volume of a regular tetrahedron of edge length 1 is  $\frac{\sqrt{2}}{12}$ .
82 \end{frame}
83 \begin{frame}{Remaining parts of Question No. 5}
84 \item The quadratic equation  $ax^2 + bx + c = 0$  has roots
85  $r_1, r_2 = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ .
86 \item The derivative of a function  $f$ , denoted  $f'$ , is defined by
87  $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ .
88 \end{frame}
89 \begin{frame}{Remaining parts of Question No.5}
90 \item A real-valued function  $f$  is convex on an interval  $I$  if
91  $f(\lambda x + (1 - \lambda)y) \leq \lambda f(x) + (1 - \lambda)f(y)$ ,
92 for all  $x, y \in I$  and  $0 \leq \lambda \leq 1$ .
93 \item The general solution to the differential equation
94  $y'' - 3y' + 2y = 0$ 

```

download 1.png

main.tex

File outline

We can't find any sections or subsections in this file.

[Find out more about the file outline](#)

Source Rich Text

```

92   \item For all  $x, y \in \mathbb{R}$  and  $\lambda \in \mathbb{R}$ 
93   \item The general solution to the differential equation
94   
$$-3y' + 2y = 0$$

95   is
96   
$$y = C_1 e^{\lambda x} + C_2 e^{2x}$$

97   \item The Fermat number  $F_n$  is defined as
98   
$$F_n = 2^{2^n} + 1, n \geq 0$$

99   \end{frame}
100 \end{itemize}
101 \begin{itemize}
102 \begin{frame}{Question No.6}
103   \item  $\frac{d}{dx} \left( \frac{x}{x+1} \right) = \frac{1}{(x+1)^2}$ 
104   \item  $\lim_{n \rightarrow \infty} \left( 1 + \frac{1}{n} \right)^n = e$ 
105   \item \left|
106   \begin{array}{cc}
107   a & b \\
108   c & d
109   \end{array}
110   \right|
111   = ad - bc
112   \item  $\mathcal{R}_\theta = \left[
113   \begin{array}{cc}
114   \cos \theta & -\sin \theta \\
115   \sin \theta & \cos \theta
116   \end{array}
117   \right]$ 
118 \end{frame}
119 \begin{frame}{Remaining parts of Question No.6}
120   \item \left|
121   \begin{array}{ccc}
122   \mathbf{i} & \mathbf{j} & \mathbf{k} \\
123   a_1 & a_2 & a_3 \\
124   b_1 & b_2 & b_3

```

Source Rich Text

download 1.png

main.tex

```
121 \begin{array}{ccc}
122 \textbf{i} & \textbf{j} & \textbf{k} \\
123 a_1 & a_2 & a_3 \\
124 b_1 & b_2 & b_3 \\
125 \end{array} \\
126 \right| = \left| \\
127 \begin{array}{cc}
128 a_2 & a_3 \\
129 b_2 & b_3 \\
130 \end{array} \\
131 \right| \textbf{i} - \left| \\
132 \begin{array}{cc}
133 a_1 & a_3 \\
134 b_1 & b_3 \\
135 \end{array} \\
136 \right| \textbf{j} + \left| \\
137 \begin{array}{cc}
138 a_1 & a_2 \\
139 b_1 & b_2 \\
140 \end{array} \\
141 \right| \textbf{k} \\
142 \item \left[ \\
143 \begin{array}{cc}
144 a_{11} & a_{12} \\
145 a_{21} & a_{22} \\
146 \end{array} \\
147 \right] \left[ \\
148 \begin{array}{cc}
149 b_{11} & b_{12} \\
150 b_{21} & b_{22} \\
151 \end{array} \\
152 \right] = \left[ \\
153 \begin{array}{cc}
```

File outline

We can't find any sections or subsections in this file.

[Find out more about the file outline](#)

Source Rich Text

- download 1.png
- main.tex

```
152 | \right] = \left[
153 | \begin{array}{cc}
154 | a_{11}b_{11} + a_{12}b_{21} & a_{11}b_{12} + a_{12}b_{22} \\
155 | a_{21}b_{11} + a_{22}b_{21} & a_{21}b_{12} + a_{22}b_{22} \\
156 | \end{array} \\
157 | \right]$$
158 | \end{frame}
159 | \begin{frame}{Remaining parts of Question No.6}
160 | \item $$f(x) = \left\{ \begin{array}{l}
161 | -x^2, x > 0 \\
162 | x^2, 0 \leq x \leq 2 \\
163 | 4, x > 2 \\
164 | \end{array} \right. \\
165 | \end{array} \\
166 | \right. $$ \\
167 | \end{frame}
168 | \end{itemize}
169 | \begin{frame}{Multi-Line Equations}
170 | \begin{block}{(i) part of Question No.7}
171 | \end{block}
172 | \begin{eqnarray*}
173 | 1+2 & = & 3 \\
174 | 4+5+6 & = & 7+8 \\
175 | 9+10+11+12 & = & 13+14+15 \\
176 | 16+17+18+19+20 & = & 21+22+23+24 \\
177 | 25+26+27+28+29+30 & = & 31+32+33+34+35 \\
178 | \end{eqnarray*} \\
179 | \end{frame}
180 | \begin{frame}{Multi-Line Equations}
181 | \begin{block}{(ii) part of Question No.7}
182 | \end{block}
183 | \\
184 | \begin{eqnarray*}
```

File outline

We can't find any sections or subsections in this file.

[Find out more about the file outline](#)

Source Rich Text

download 1.png main.tex

File outline We can't find any sections or subsections in this file. Find out more about the file outline

```

182 \end{block}
183
184 \begin{eqnarray*}
185 (a+b)^2 & = & (a+b)(a+b) \\
186 & = & (a+b)a + (a+b)b \\
187 & = & a(a+b) + b(a+b) \\
188 & = & a^2 + ab + ba + b^2 \\
189 & = & a^2 + ab + ab + b^2 \\
190 & = & a^2 + 2ab + b^2 \\
191 \end{eqnarray*}
192 \end{frame}
193 \begin{frame}{Multi-Line Equations}
194 \begin{block}{(iii) part of Question No.7}
195 \end{block}
196 \begin{eqnarray*}
197 \tan(\alpha+\beta+\gamma) & = & \frac{\tan(\alpha+\beta)+\tan\gamma}{1-\tan(\alpha+\beta)\tan\gamma} \\
198 & = & \frac{\frac{\tan\alpha+\tan\beta}{1-\tan\alpha\tan\beta}+\tan\gamma}{1-\frac{\tan\alpha+\tan\beta}{1-\tan\alpha\tan\beta}\tan\gamma} \\
199 & = & \frac{\tan\alpha+\tan\beta+(1-\tan\alpha\tan\beta)\tan\gamma}{1-\tan\alpha\tan\beta-\tan\alpha\tan\beta\tan\gamma} \\
200 & = & \frac{\tan\alpha+\tan\beta+\tan\gamma-\tan\alpha\tan\beta\tan\gamma}{1-\tan\alpha\tan\beta-\tan\alpha\tan\beta\tan\gamma} \\
201 \end{eqnarray*}
202
203 \end{frame}
204 \begin{frame}{Multi-Line Equations}
205 \begin{block}{(iv) part of Question No.7}
206 \end{block}
207
208 \begin{eqnarray*}
209 \prod_p (1-\frac{1}{p^2}) & = & \prod_p \frac{1}{1+\frac{1}{p^2}+\frac{1}{p^4}+\dots} \\
210 & = & \left(\prod_p \left(1+\frac{1}{p^2}+\frac{1}{p^4}+\dots\right)\right)^{-1} \\
211 & = & \left(1+\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+\dots\right)^{-1} \\
212 & = & \frac{6}{\pi^2} \\
213 \end{eqnarray*}
214 \end{frame}

```

Source Rich Text

download 1.png

main.tex

File outline

We can't find any sections or subsections in this file. [Find out more about the file outline](#)

```

189 & = & a^2 + 2ab + b^2 \\
190 & = & a^2 + 2ab + b^2
191 \end{eqnarray*}
192 \end{frame}
193 \begin{frame}{Multi-Line Equations}
194 \begin{block}{(iii) part of Question No.7}
195 \end{block}
196 \begin{eqnarray*}
197 \tan(\alpha+\beta)+\gamma & = & \frac{\tan(\alpha+\beta)+\tan\gamma}{1-\tan(\alpha+\beta)\tan\gamma} \\
198 & = & \frac{\frac{\tan\alpha+\tan\beta}{1-\tan\alpha\tan\beta}+\tan\gamma}{1-\frac{\tan\alpha+\tan\beta}{1-\tan\alpha\tan\beta}\tan\gamma} \\
199 & = & \frac{\tan\alpha+\tan\beta+(1-\tan\alpha\tan\beta)\tan\gamma}{1-\tan\alpha\tan\beta-\tan\alpha\tan\beta\tan\gamma} \\
200 & = & \frac{\tan\alpha+\tan\beta+\tan\gamma-\tan\alpha\tan\beta\tan\gamma}{1-\tan\alpha\tan\beta-\tan\alpha\tan\beta\tan\gamma} \\
201 \end{eqnarray*}
202
203 \end{frame}
204 \begin{frame}{Multi-Line Equations}
205 \begin{block}{(iv) part of Question No.7}
206 \end{block}
207
208 \begin{eqnarray*}
209 \prod_p(1-\frac{1}{p^2}) & = & \prod_p \frac{1}{1+\frac{1}{p^2}+\frac{1}{p^4}+\dots} \\
210 & = & \left(\prod_p \left(1+\frac{1}{p^2}+\frac{1}{p^4}+\dots\right)\right)^{-1} \\
211 & = & \left(1+\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+\dots\right)^{-1} \\
212 & = & \frac{6}{\pi^2} \\
213 \end{eqnarray*}
214 \end{frame}
215 \begin{center}
216 \includegraphics[angle=0,scale=0.16]{download 1.png}
217 \end{center}
218
219 \end{document}
220
221

```