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1 \documentclass[10pt]{beamer}
2 \usepackage[utf8]{inputenc}
3
4
5 \title{Assignment 2}
6 \author{Shruti Kaushik\\ 20044563021\\
7 MAT/20/85}
8 \institute{\Large Mata Sundri College For
9 Women\\
10 University of Delhi}
11 \date{}
12 \usetheme{Copenhagen}
13
14 \begin{document}
15 \begin{frame}
16 \begin{minipage}{0.13\textwidth}
17 \includegraphics[width=2cm,height=2cm]{MSC
18 W logo.png}
19 \end{minipage}\hfill
20 \begin{minipage}{0.13\textwidth}
21 \includegraphics[width=2.5cm,height=2cm]{8
22 0759944.jpg}
23 \end{minipage}
24 \maketitle
25 \end{frame}
26 \setbeamertemplate{background}{\includegra
27 phics[width=\paperwidth,height=\paperheigh
28 t]{background 2.jpg}}
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28     where the  $x_i$  are non negative real
        numbers.
29     Set
30     
$$M_r(\mathbf{x}) = \left( \frac{x_1^r + x_2^r + \dots + x_n^r}{n} \right)^{1/r},$$

        ;  $r \in \mathbf{R} \setminus \{0\},$ 
31     and
32     
$$M_0(\mathbf{x}) = \left( \frac{x_1 + x_2 + \dots + x_n}{n} \right)^{1/n}.$$

33     We call  $M_r(\mathbf{x})$  the
         $r$ th power mean of
         $\mathbf{x}$ .
34     Claim:
35     
$$\lim_{r \rightarrow 0} M_r(\mathbf{x}) = M_0(\mathbf{x}).$$

36     \end{block}
37 \end{frame}
38 \begin{frame}
39 \begin{block}
40
41     Define
42     
$$V_n =$$

43     
$$\begin{bmatrix} 1 & 1 & 1 & \dots & 1 \\ x_1 & x_2 & x_3 & \dots & x_n \\ x_1^2 & x_2^2 & x_3^2 & \dots & x_n^2 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ x_1^{n-1} & x_2^{n-1} & x_3^{n-1} & \dots & x_n^{n-1} \end{bmatrix}$$

44     We call  $V_n$  the Vandermonde
        matrix of order  $n$ .
45     Claim:  $\det V_n = \prod_{1 \leq i < j \leq n} (x_j - x_i).$ 
46     \end{block}
47 \end{frame}
48 \begin{frame}{Question 4.}
49 \begin{block}
50
51 \end{block}
52 \end{frame}

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55 ▾ \begin{block}
56
57     \item $$3^3 + 4^3 + 5^3=6^3$$
58 \end{block}
59 ▾ \begin{block}
60
61     \item $$\sqrt{100} = 10$$
62 \end{block}
63 ▾ \begin{block}
64
65     \item \[(a+b)^3=a^3+3a^2b+3ab^2+b^3\]
66 \end{block}
67 ▾ \begin{block}
68
69     \item \[\sum_{k=1}^n k=\frac{n(n+1)}{2}\]
70 \end{block}
71 ▾ \begin{block}
72
73     \item \[\frac{\pi}{4}=\frac{1}{1}-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+\frac{1}{9}-\frac{1}{11}+\ldots\]
74 \end{block}
75 \end{frame}
76 ▾ \begin{frame}{Remaining Parts of Question 4}
77 ▾ \begin{block}
78
79     \item \[\cos\theta=\sin(90^\circ-\theta)\]
80 \end{block}
81 ▾ \begin{block}
82
83     \item \[e^{i\theta} = \cos\theta + is in\the
84 \end{block}
85 ▾ \begin{block}
86
87     \item \[\lim_{\theta\rightarrow 0}\frac{\sin\theta}{\theta}=1.\]
88 \end{block}
89 ▾ \begin{block}
90
91     \item \[\lim_{x\rightarrow\infty}\frac{\pi(x)}{x/\log x}=1\]

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92 \end{block}
93 \begin{block}
94
95 \item \int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}
96 \end{block}
97 \end{frame}
98 \begin{frame}{Question 5}
99 \begin{block}
100
101 \item Positive numbers a, b, and c are the side
lengths of a triangle if and only if  $a + b > c$ ,
 $b + c > a$ , and  $c + a > b$ .
102 \end{block}
103 \begin{block}
104
105 \item The area of a triangle with side lengths
a, b, and c is given by Heron's formula:
106  $A = \sqrt{s(s-a)(s-b)(s-c)}$ ,
107 where s is the semiperimeter  $(a+b+c)/2$ .
108 \end{block}
109 \begin{block}
110
111 \item The volume of a regular tetrahedron of
edge length 1 is  $\sqrt{2}/12$ .
112 \end{block}
113 \end{frame}
114
115 \begin{frame}{Remaining Parts of Question 5}
116 \begin{block}
117
118 \item The quadratic equation  $ax^2 + bx + c = 0$  has
roots
119  $r_1, r_2 = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ 
120 \end{block}
121 \begin{block}
122
123 The derivative of a function f, denoted f', is
defined by
124  $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ 
125 \end{block}
126 \begin{block}
127

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127
128     A real valued function f is convex on an
        interval I if
129     \[f(\lambda x+(1-\lambda)y)\le\lambda
        f(x)+(1-\lambda)f(y),\] for all \((x,y\in
        I\);; \quad and\);;0 \leq \lambda \leq 1.\)\)
130 \end{block}
131 \end{frame}
132
133 ▾ \begin{frame}{Remaining Parts of Question 5}
134 ▾ \begin{block}
135
136     The general solution to the differential
        equation
137     \[y''-3y'+2y=0\] is
138     \[y=C_{1}e^x+C_{2}e^{2x}\]
139     \end{block}
140 ▾ \begin{block}
141
142     The Fermat number  $F_n$  is defined as\
143     \[F_n=2^{2^n}, n\ge 0.\]
144     \end{block}
145 \end{frame}
146 ▾ \begin{frame}{Question 6}
147 ▾ \begin{block}
148
149     \[\frac{d}{dx}\left(\frac{x}{x+1}\right)=\frac{
        1}{(x+1)^2}\]
150 \end{block}
151 ▾ \begin{block}
152
153     \[\lim_{n
        \rightarrow\infty}\left(1+\frac{1}{n}\right)^n=
        e\]
154 \end{block}
155 ▾ \begin{block}
156
157     \[\begin{vmatrix}
158         a & b\\
159         c & d\\
160     \end{vmatrix} = ad-bc\]
161 \end{block}
162 ▾ \begin{block}
163

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163
164 \[R_\theta
165 =\left[\begin{array}{cc}
166 \cos \theta & -\sin \theta \\
167 \sin \theta & \cos \theta
168 \end{array}\right]
169 \right]
170 \]
171 \end{block}
172 \end{frame}
173 \begin{frame}{Remaining Parts of Question 6}
174 \begin{block}
175
176 \item\[\begin{vmatrix} \textbf{i} & \textbf{j} & \textbf{k} \\
177 a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \end{vmatrix}
= \begin{vmatrix} a_2 & a_3 \\ b_2 & b_3 \end{vmatrix} \textbf{i} - \begin{vmatrix} a_1 \\ a_3 \\ b_1 & b_3 \end{vmatrix} \textbf{j} +
\begin{vmatrix} a_1 & a_2 \\ b_1 & b_2 \end{vmatrix} \textbf{k} \]
178 \end{block}
179 \begin{block}
180
181 \item\[\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}
182 \end{bmatrix}
183 \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix}
184 \end{bmatrix} =
185 \begin{bmatrix}
186 a_{11}b_{11} + a_{12}b_{22} & a_{11}b_{12}
187 + a_{12}b_{21} \\
188 a_{21}b_{11} + a_{22}b_{21} & a_{21}b_{12} +
189 a_{22}b_{22} \end{bmatrix}
190 \end{bmatrix}
191 \end{block}
192 \item \[f(x) = \begin{cases}
193 -x^2, & x < 0 \\
194 x^2, & 0 \leq x \leq 2 \\
195 4, & x > 2
196 \end{cases} \]
197 \end{block}
198 \end{frame}
199 \begin{frame}{Question 7 Part 1}
200 \begin{block}

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202 ▾ \begin{align*}
203     1+2 \quad & = \quad 3 \\
204     4+5+6 \quad & = \quad 7+8 \\
205     9+10+11+12 \quad & = \quad 13+14+15 \\
206     16+17+18+19+20 \quad & = \quad 21+22+23+24 \\
207     25+26+27+28+29+30 \quad & = \quad 31+32+33+34+35 \\
208 \end{align*}
209 \end{block}
210 \end{frame}
211 ▾ \begin{frame}{Part 2}
212 ▾ \begin{block}
213
214 ▾ \begin{align*}
215     (a+b)^2 \quad & = \quad (a+b)(a+b) \\
216     & = \quad (a+b)a + (a+b)b \\
217     & = \quad a(a+b) + b(a+b) \\
218     & = \quad a^2+ab+ba+b^2 \\
219     & = \quad a^2+ab+ab+b^2 \\
220     & = \quad a^2+2ab+b^2 \\
221 \end{align*}
222 \end{block}
223 \end{frame}
224 ▾ \begin{frame}{Part 3}
225 ▾ \begin{block}
226
227 ▾ \begin{align*}
228     \tan(\alpha+\beta+\gamma) & = \frac{\tan(\alpha+ \\
& \beta) + \tan\gamma}{1 - \tan(\alpha+\beta)\tan\gamma} \\
229     & = \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} \\
230     & = \frac{\tan\alpha+\tan\beta+(1-\tan\alpha\tan\beta)\tan\gamma}{1 - \tan\alpha\tan\beta - (\tan\alpha+\tan\beta)\tan\gamma} \\
231     & = \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} \\
232 \end{align*}
233 \end{block}
234 \end{frame}
235 ▾ \begin{frame}{Part 4}
236 ▾ \begin{block}
237
238 ▾ \begin{eqnarray*}
239     \prod_p \left(1 - \frac{1}{p^2}\right) & = & \prod_p \frac{1}{1 + \frac{1}{p^2} + \frac{1}{p^4} + \cdots} \\
240     & = & \left(\prod_p \left(1 + \frac{1}{p^2} + \frac{1}{p^4} + \cdots\right)\right)^{-1}
\end{eqnarray*}

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240  &=&\left(\prod_p\left(1+\frac{1}{p^2}+\frac{1}{p^4}
      +\cdots\right)\right)^{-1}\!
241  &=&\left(1+\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}
      +\cdots\right)^{-1}\!
242  &=&\frac{6}{\pi^2}
243  \end{eqnarray*}
244  \end{block}
245  \end{frame}
246  \setbeamertemplate{background}{\includegraphics
      [width=\paperwidth,height=\paperheight]{thankyou.
      jpg}}
247  \begin{frame}
248
249  \end{frame}
250  \end{document}

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