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1 \documentclass{beamer}
2 \usepackage[utf8]{inputenc}
3 \usepackage{kerkis}
4 \usepackage{tcolorbox}
5
6 \title{ASSIGNMENT 2}
7 \subtitle{\LaTeX Presentation}
8 \author{Ritika Kamboj \ \ MAT/20/122 \ \ 20044563047}
9 \date{}
10 \institute{Mata Sundri College For Women \ \ University of Delhi}
11
12 \usetheme{Berlin}
13 \usecolortheme{beaver}
14 \usefonttheme{serif}
15
16
17 \begin{document}
18 {\setbeamertemplate{background}{\includegraphics[width=\paperwidth,height=\paperheight]{background.jpeg}}}
19 \begin{frame}
20 \titlepage
21
22 \end{frame}
23 \begin{frame}
24 | \frametitle{Content of the page number 69}
25 \begin{enumerate}
26 \item
27 Let  $\mathbf{x}=\{x_1,\dots,x_n\}$ , where the  $x_i$  are non-negative real numbers.
28 Set
29  $M_r(\mathbf{x})=\left(\frac{x_1^r+x_2^r+\dots+x_n^r}{n}\right)^{1/r}$ ,
30  $\forall r \in \mathbf{R}$  \setminus  $\{0\}$ , \
31 and
32  $M_0(\mathbf{x})=\left(x_1x_2\dots x_n\right)^{1/n}$ . \
33 We call  $M_r(\mathbf{x})$  the  $r$ th power mean of  $\mathbf{x}$ . \

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33 We call  $M_r(\mathbf{x})$  the  $r^{\text{th}}$  power mean of  $\mathbf{x}$ . \\
34 Claim: \\
35  $\lim_{r \rightarrow 0} M_r(\mathbf{x}) = M_0(\mathbf{x})$ . \\
36 \item \\
37 Define \\
38 \end{enumerate} \\
39 \end{frame} \\
40 \begin{frame} \\
41  $V_n =$  \\
42 \left[ \\
43 \begin{array}{cccc}
44 1 & 1 & 1 & \cdots & 1 \\
45 x_1 & x_2 & x_3 & \cdots & x_n \\
46 x_1^2 & x_2^2 & x_3^2 & \cdots & x_n^2 \\
47 \vdots & \vdots & \vdots & \ddots & \vdots \\
48 x_1^{n-1} & x_2^{n-1} & x_3^{n-1} & \cdots & x_n^{n-1}
49 \end{array} \\
50 \right] \\
51 We call  $V_n$  the Vandermonde matrix of order  $n$ . \\
52 Claim:  $\det V_n = \prod_{1 \leq i < j \leq n} (x_j - x_i)$  \\
53 \end{frame} \\
54 \begin{frame}{Question. 4} \\
55 \begin{itemize} \\
56 \begin{tcolorbox} \\
57 \item  $3^3 + 4^3 + 5^3 = 6^3$  \\
58 \item  $\sqrt{100} = 10$  \\
59 \item  $(a+b)^3 = a^3 + b^3 + 3a^2b + 3ab^2$  \\
60 \item  $\sum_{k=1}^n k = \frac{n(n+1)}{2}$  \\
61 \item  $\frac{\pi}{4} = \frac{1}{1} - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \dots$  \\
62 \end{tcolorbox} \\
63 \end{itemize} \\
64 \end{frame}{Remaining parts of Ques.4} \\
65 \begin{itemize}

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64 - \begin{frame}{Remaining parts of Ques.4}
65 - \begin{itemize}
66 - \item  $\cos\theta = \sin(90^\circ - \theta)$ 
67 - \item  $e^{i\theta} = \cos\theta + i\sin\theta$ 
68 - \item  $\lim_{x \rightarrow \infty} \frac{\sin x}{x} = 1$ 
69 - \item  $\lim_{x \rightarrow \infty} \frac{\pi(x)}{x \log x} = 1$ 
70 - \item  $\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}$ 
71 - \end{itemize}
72 - \end{frame}
73 - \begin{frame}{Question 5}
74 - \begin{itemize}
75 - \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  $c + a > b$ .
76 - \item The area of a triangle with side lengths  $a, b, c$  is given by Heron's formula:
77 - 
$$A = \sqrt{s(s-a)(s-b)(s-c)},$$

78 - where  $s$  is the semiperimeter  $(a+b+c)/2$ .
79 - \item The volume of a regular tetrahedron of edge length 1 is  $\sqrt{2}/12$ .
80 - \item The quadratic equation  $ax^2 + bx + c = 0$  has roots  $r_1, r_2 = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ .
81 - \end{itemize}
82 - \end{frame}
83 - \begin{frame}{Remaining Parts of Ques.5}
84 - \begin{itemize}
85 - \item The derivative of a function  $f$ , denoted  $f'$ , is defined by  $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ .
86 - \item A real-valued function  $f$  is convex on an interval  $I$  if  $f(\lambda x + (1-\lambda)y) \leq \lambda f(x) + (1-\lambda)f(y)$ ,
87 - for all  $x, y \in I$ : and  $0 \leq \lambda \leq 1$ 
88 - \item The general solution to the differential equation  $y'' - 3y' + 2y = 0$  is  $y = C_1 e^x + C_2 e^{2x}$ .
89 - \end{itemize}
90 - \end{frame}
91 - \begin{frame}{Remaining part of Ques.5}
92 - \begin{itemize}
93 -
94 - \item The Fermat number  $F_n$  is defined as  $F_n = 2^{2^n} + 1, n \geq 0$ .
95 - \end{itemize}
96 - \end{frame}

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96 \end{frame}
97 \begin{frame}{Question 6}
98 \begin{itemize}
99 \item \[\frac{d}{dx}\left(\frac{x}{x+1}\right)=\frac{1}{(x+1)^2}\]
100 \item \[\lim_n
101 \rightarrow\infty\left(1+\frac{1}{n}\right)^n = e \]
102 \item \[\begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad-bc\]
103 \item \[R_\theta = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}\]
104 \end{itemize}
105 \end{frame}
106 \begin{frame}{Remaining Parts of Ques.6}
107 \begin{itemize}
108 \item \[\begin{vmatrix} \text{bf}{i}&\text{bf}{j}&\text{bf}{k} \\ a_1&a_2&a_3 \\ b_1&b_2&b_3 \end{vmatrix} = \begin{vmatrix} a_2&a_3 \\ b_2&b_3 \end{vmatrix}
\text{bf}{i} - \begin{vmatrix} a_1&a_3 \\ b_1&b_3 \end{vmatrix} + \begin{vmatrix} a_1&a_2 \\ b_1&b_2 \end{vmatrix} \text{bf}{k}\]
109 \item \[\begin{bmatrix} a_{11}&a_{12} \\ a_{21}&a_{22} \end{bmatrix} \begin{bmatrix} b_{11}&b_{12} \\ b_{21}&b_{22} \end{bmatrix} = \begin{bmatrix} a_{11}b_{11}+a_{12}b_{21} & a_{11}b_{12}+a_{12}b_{22} \\ a_{21}b_{11}+a_{22}b_{21} & a_{21}b_{12}+a_{22}b_{22} \end{bmatrix}\]
110 \item \[f(x) = \begin{cases}
111 -x^2, & x < 0 \\
112 x^2, & 0 \leq x \leq 2 \\
113 4, & x > 2 \end{cases}\]
114 \end{itemize}
115 \end{frame}
116 \begin{frame}{Question 7(1)}
117 \begin{align*}
118 | 1+2 &= 3 \\
119 | 4+5+6 &= 7+8 \\
120 | 9+10+11+12 &= 13+14+15 \\
121 | 16+17+18+19+20 &= 21+22+23+24 \\
122 | 25+26+27+28+29+30 &= 31+32+33+34+35
123 \end{align*}
124 \end{frame}
125 \begin{frame}{Question 7(2)}
126 \begin{align*}

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125 - \begin{frame}{Question 7(2)}
126 - \begin{align*}
127   (a+b)^2&=(a+b)(a+b)\\
128   &=a(a+b)+b(a+b)\\
129   &=a^2+ab+ba+b^2\\
130   &=a^2+ab+ab+b^2\\
131   &=a^2+2ab+b^2
132 \end{align*}
133 \end{frame}
134 \begin{frame}{Question 7(3)}
135 - \begin{align*}
136 - \tan(\alpha+\beta) &= \frac{\tan\alpha + \tan\beta}{1 - \tan\alpha \tan\beta} \\
137 &= \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} \\
138 &= \frac{\tan\alpha + \tan\beta + (1 - \tan\alpha \tan\beta)\tan\gamma}{1 - \tan\alpha \tan\beta - (\tan\alpha + \tan\beta)\tan\gamma} \\
139 &= \frac{\tan\alpha + \tan\beta + \tan\gamma - \tan\alpha \tan\beta \tan\gamma}{1 - \tan\alpha \tan\beta - \tan\alpha \tan\beta \tan\gamma} \\
140 \end{align*}
141 \end{frame}
142 \begin{frame}{Question 7(4)}
143 - \begin{align*}
144 - \prod_p \left(1 - \frac{1}{p^2}\right) &= \prod_p \frac{1}{1 + \frac{1}{p^2} + \frac{1}{p^4} + \dots} \\
145 &= \left(\prod_p \left(1 + \frac{1}{p^2} + \frac{1}{p^4} + \dots\right)\right)^{-1} \\
146 &= \left(1 + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \dots\right)^{-1} \\
147 &= \frac{6}{\pi^2} \\
148 \end{align*}
149 \end{frame}
150 \end{frame}
151 \setbeamertemplate{background}{\includegraphics[width=\paperwidth,height=\paperheight]{images.jpg}}
152 - \begin{frame}
153 \end{frame}
154 \end{frame}
155 \end{document}
156
157

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