

```

1 \documentclass[10pt]{beamer}
2 \usepackage[utf8]{inputenc}
3 \usepackage{graphicx}
4 \usepackage{xcolor}
5 \definecolor{Amethyst}{rgb}{0.6,0.40,0.8}
6 \definecolor{Dark Lavender}{rgb}{0.45,0.39,0.59}
7 \definecolor{pastelpurple}{rgb}{0.59,0.44,0.84}
8 \usetheme{Berlin}
9 \usecolortheme[named=Amethyst]{structure}
10 \title{\textbf{ASSIGNMENT}}
11 \author{\textbf{\textcolor{Dark Lavender}{Shweta Shukla}} \ College Roll No.- MAT/20/9\ University Roll No. - 20044563006}
12 \date{}
13 \institute{MATA SUNDRI COLLEGE FOR WOMEN\
14 (UNIVERSITY OF DELHI)}
15 \begin{document}
16 \begin{frame}\textbf{Presentation}
17 \maketitle
18
19
20 \end{frame}
21
22 \begin{frame}{Example 9.5}
23
24 \begin{itemize}
25 \item Let  $\mathbf{x}=(x_1,\dots,x_n)$ ,
26 where the  $x_i$  are non-negative real numbers.
27 Set
28 \[
29 M_r(\mathbf{x})=\left(\frac{x_1^r+x_2^r+\dots+x_n^r}{n}\right)^{1/r}
30 \];  $r$  in  $\mathbb{R}$  \setminus  $\{0\}$ ,
31 \]
32 and
33 \[
34 M_0(\mathbf{x})=\left(x_1 x_2 \dots x_n\right)^{1/n}.
35 \]
36 We call  $M_r(\mathbf{x})$  the  $r$ th power mean of  $\mathbf{x}$ .
37
38 Claim:
39 \[
40 \lim_{r \rightarrow 0} M_r(\mathbf{x}) = M_0(\mathbf{x}).
41 \]
42
43 \end{itemize}
44
45 \end{frame}
46 \begin{frame}{Continued Example 9.5}
47 \begin{itemize}
48 \item Define
49 \[
50 V_n=
51 \left[
52 \begin{array}{cccc}
53 1 & 1 & 1 & \dots & 1 \\
54 x_1 & x_2 & x_3 & \dots & x_n \\
55 x_1^2 & x_2^2 & x_3^2 & \dots & x_n^2 \\
56 \vdots & \vdots & \vdots & \ddots & \vdots \\
57 x_1^{n-1} & x_2^{n-1} & x_3^{n-1} & \dots & x_n^{n-1}
58 \end{array}
59 \right]
60 \]
61 We call  $V_n$  the Vandermonde matrix of order  $n$ .
62
63 Claim:
64 \[
65 \det V_n = \prod_{1 \leq i < j \leq n} (x_j - x_i).
66 \]
67
68 \end{itemize}
69 \end{frame}
70 \begin{frame}{Question 4}
71 \begin{itemize}
72 \item  $3^4+4^4+5^4=6^4$ 
73 \item  $\sqrt{100}=10$ 
74 \item  $(a+b)^3 = a^3+3a^2b+3ab^2+b^3$ 
75 \item  $\sum_{k=1}^n k = \frac{n(n+1)}{2}$ 
76 \item  $\frac{d}{dx} \ln(x) = \frac{1}{x}$ 
77 \item  $\cos(\theta) = \sin(90^\circ - \theta)$ 
78 \end{itemize}
79
80 \end{frame}
81 \begin{frame}{Continued Question 4}
82
83 \begin{itemize}
84 \item  $e^{i\theta} = \cos(\theta) + i\sin(\theta)$ 
85 \item  $\lim_{\theta \rightarrow 0} \frac{\sin(\theta)}{\theta} = 1$ 
86 \item  $\lim_{x \rightarrow \infty} \frac{\ln(x)}{x} = 0$ 
87 \item  $\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}$ 
88 \end{itemize}
89
90 \end{frame}

```



Source Rich Text

```
91- \begin{frame}{{Question 5}}
92
93
94- \begin{itemize}
95-   \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  $c+a > b$ .
96-   \item The area of a triangle with side lengths  $a$ ,  $b$ ,  $c$  is given by \emph{Heron's Formula}:
97-   
$$S = \sqrt{s(s-a)(s-b)(s-c)}$$
,
98-   where  $s$  is the semi perimeter  $\frac{a+b+c}{2}$ .
99-   \item The volume of a regular tetrahedron of edge length 1 is  $\frac{\sqrt{2}}{12}$ .
100-   \item The quadratic equation  $ax^2 + bx + c = 0$  has roots
101-   
$$r_1, r_2 = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

102- \end{itemize}
103
104 \end{frame}
105- \begin{frame}{{Continued Question 5}}
106
107- \begin{itemize}
108-   \item The \emph{derivative} of a function  $f$ , denoted  $f'$  is defined by :
109-   
$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

110-   \item A real-valued function  $f$  is \emph{convex} on an interval  $I$  if
111-   
$$f(\lambda x + (1-\lambda)y) \leq \lambda f(x) + (1-\lambda)f(y)$$

112-   for all  $x, y \in I$ ;  $\lambda \in [0, 1]$ ; and  $0 \leq \lambda \leq 1$ .
113-   \item The general solution to the differential equation
114-   
$$y'' - 3y' + 2y = 0$$
 is  $y = C_1 e^x + C_2 e^{2x}$ .
115- \end{itemize}
116
117 \end{frame}
118- \begin{frame}{{Continued Question 5}}
119
120
121- \begin{itemize}
122-   \item The Fermat number  $F_n$  is defined as
123-   
$$F_n = 2^{2^n} + 1, \quad n \geq 0$$

124- \end{itemize}
125
126 \end{frame}
127- \begin{frame}{{Question 6}}
128
129
130- \begin{itemize}
131-   \item  $\frac{d}{dx} \left( \frac{x}{x+1} \right) = \frac{1}{(x+1)^2}$ 
132-   \item  $\lim_{n \rightarrow \infty} \left( 1 + \frac{1}{n} \right)^n = e$ 
133-   \item
134-   \left[
135-     \begin{array}{cc}
136-       a & b \\
137-       c & d
138-     \end{array}
139-   \right] = ad - bc
140-   \right]
141-   \item  $R_{\theta} =$ 
142-   \left[ \begin{array}{cc}
143-     \cos \theta & -\sin \theta \\
144-     \sin \theta & \cos \theta
145-   \end{array} \right]
146- \end{itemize}
147
148 \end{frame}
149- \begin{frame}{{Continued Question 6}}
150
151- \begin{itemize}
152-   \item
153-   \left[ \begin{array}{ccc}
154-     \mathbf{a}_1 & \mathbf{a}_2 & \mathbf{a}_3 \\
155-     \mathbf{b}_1 & \mathbf{b}_2 & \mathbf{b}_3
156-   \end{array} \right] =
157-   \left[ \begin{array}{cc}
158-     \mathbf{a}_2 & \mathbf{a}_3 \\
159-     \mathbf{b}_2 & \mathbf{b}_3
160-   \end{array} \right] \mathbf{a}_1 +
161-   \left[ \begin{array}{cc}
162-     \mathbf{a}_1 & \mathbf{a}_3 \\
163-     \mathbf{b}_1 & \mathbf{b}_3
164-   \end{array} \right] \mathbf{b}_1 +
165-   \left[ \begin{array}{cc}
166-     \mathbf{a}_1 & \mathbf{a}_2 \\
167-     \mathbf{b}_1 & \mathbf{b}_2
168-   \end{array} \right] \mathbf{c}_1
169-   \end{array} \right] \mathbf{c}_1
170-   \left[ \begin{array}{ccc}
171-     \mathbf{a}_{11} & \mathbf{a}_{12} \\
172-     \mathbf{a}_{21} & \mathbf{a}_{22}
173-   \end{array} \right]
174-   \left[ \begin{array}{cc}
175-     \mathbf{b}_{11} & \mathbf{b}_{12} \\
176-     \mathbf{b}_{21} & \mathbf{b}_{22}
177-   \end{array} \right]
178- \end{array} \right]
```



Source Rich Text

```
179 =
180 \left[ \begin{array}{cc}
181 a_{11}b_{11}+a_{12}b_{21} & a_{11}b_{12}+a_{12}b_{22} \\
182 a_{21}b_{11}+a_{22}b_{21} & a_{21}b_{12}+a_{22}b_{22}
183 \end{array} \right]
184 \item \left[ \left. \begin{array}{l}
185 -x^2 \text{ , , , } x<0 \\
186 \text{ ; } x^2 \text{ ; , , } 0 \leq x \leq 2 \\
187 \text{ ; } 4 \text{ ; , , } x>2
188 \end{array} \right\} \right]
189 \end{itemize}
190 \end{frame}
191
192 \begin{frame}{Question 7 Part 1}
193 \begin{eqnarray*}
194 1+2 & =& 3 \\
195 4+5+6 & =& 7+8 \\
196 9+10+11+12 & =& 13+14+15 \\
197 16+17+18+19+20 & =& 21+22+23+24 \\
198 25+26+27+28+29+30 & =& 31+32+33+34+35
199 \end{eqnarray*}
200 \end{frame}
201 \begin{frame}{Question 7 Part 2}
202 \begin{eqnarray*}
203 (a+b)^2 & =& (a+b)(a+b) \\
204 & =& (a+b)a+(a+b)b \\
205 & =& a(a+b)+b(a+b) \\
206 & =& aa+ab+ba+bb \\
207 & =& aa+ab+ab+bb \\
208 & =& a^2+2ab+b^2
209 \end{eqnarray*}
210 \end{frame}
211 \begin{frame}{Question 7 Part 3}
212
213 \begin{eqnarray*}
214 \tan(\alpha+\beta+\gamma) & =& \frac{\tan(\alpha)\tan(\beta)+\tan(\gamma)\{1-\tan(\alpha)\tan(\beta)\}\tan(\gamma)}{\{1-\tan(\alpha)\tan(\beta)\}\tan(\gamma)\{1-\tan(\alpha)\tan(\beta)\}+\tan(\gamma)\{1-\frac{\tan(\alpha)\tan(\beta)}{\tan(\gamma)}\}} \\
215 & =& \frac{\tan(\alpha)\tan(\beta)+\tan(\gamma)\{1-\tan(\alpha)\tan(\beta)\}\tan(\gamma)}{\{1-\tan(\alpha)\tan(\beta)\}\tan(\gamma)\{1-\tan(\alpha)\tan(\beta)\}+\tan(\gamma)\{1-\frac{\tan(\alpha)\tan(\beta)}{\tan(\gamma)}\}} \\
216 & =& \frac{\tan(\alpha)\tan(\beta)+\tan(\gamma)\{1-\tan(\alpha)\tan(\beta)\}\tan(\gamma)}{\{1-\tan(\alpha)\tan(\beta)\}\tan(\gamma)\{1-\tan(\alpha)\tan(\beta)\}+\tan(\gamma)\{1-\frac{\tan(\alpha)\tan(\beta)}{\tan(\gamma)}\}} \\
217 & =& \frac{\tan(\alpha)\tan(\beta)+\tan(\gamma)\{1-\tan(\alpha)\tan(\beta)\}\tan(\gamma)}{\{1-\tan(\alpha)\tan(\beta)\}\tan(\gamma)\{1-\tan(\alpha)\tan(\beta)\}+\tan(\gamma)\{1-\frac{\tan(\alpha)\tan(\beta)}{\tan(\gamma)}\}} \\
218 \end{eqnarray*}
219
220 \end{frame}
221 \begin{frame}{Question 7 Part 4}
222 \begin{eqnarray*}
223 \prod_p (1-\frac{1}{p^2}) & =& \prod_p (\frac{1}{1+\frac{1}{p^2}+\frac{1}{p^4}+\dots}) \\
224 & =& (\prod_p (1+\frac{1}{p^2}+\frac{1}{p^4}+\dots))^{-1} \\
225 & =& (1+\frac{1}{2^2}+\frac{1}{2^4}+\dots)^{-1} \\
226 & =& \frac{6}{\pi^2}
227 \end{eqnarray*}
228 \end{frame}
229
230 \begin{frame}{\textbf{END OF SLIDE}}
231 \begin{center}
232 \includegraphics[width=2.5in,height=2.5in]{tysm purple.jpg}
233 \end{center}
234 \end{frame}
235 \end{document}
```