Test Average: 83%

Quiz Wed Nov 29 Section 26.3

FINAL EXAM

Sat Dec 16

9am - noon

TEC 174

(check bus schedule in advance)

No Music Allowed

Exam Formula Sheet is on website

Bring calculator, earplugs

13 Questions

Chapter	% of Marks on Exam
23	24
24	20
27	6
25	12
26	18
16	20

Part I Derivatives
Part II Integrals
Part III Matrices
Goal: Solve systems of equations

16.1 Matrices

Matrix: rectangular array

Terminology: one matrix
two matrices

$$A=\begin{bmatrix}1 & 4 & 9\\ 2 & 6 & 0\end{bmatrix} \qquad B=\begin{bmatrix}1 & -1 & 6\\ 2 & 1 & 1\end{bmatrix} \qquad C=\begin{bmatrix}1\\ -1\\ 2\end{bmatrix}$$

Size of a matrix: (# of rows) × (# of columns)

Size of A is 2×3
" B is 2×3
" C is 3×1

Ex: Find:

a) $A+B$

$$A+B=\begin{bmatrix}2 & 3 & 15\\ 4 & 7 & 1\end{bmatrix}$$

b) $-2B$

$$-2B = \begin{bmatrix} -2 & 2 & -12 \\ -4 & -2 & -2 \end{bmatrix}$$

c) $2A - 6B$

$= 2A + (-6B)$

$$= \begin{bmatrix} 2 & 8 & 18 \\ 4 & 12 & 0 \end{bmatrix} + \begin{bmatrix} -6 & 6 & -36 \\ -12 & -6 & -6 \end{bmatrix}$$

$$= \begin{bmatrix} -4 & 14 & -18 \\ -8 & 6 & -6 \end{bmatrix}$$

d) $A + C$

$A + C$ is undefined (whenever A and C have different sizes).

Ex: Solve for x and y

a) $$\begin{bmatrix} x+3 & 7 \\ -4 & y-2 \end{bmatrix} = \begin{bmatrix} 9 & 7 \\ -4 & -7 \end{bmatrix}$$

$x + 3 = 9 \Rightarrow x = 6$

$y - 2 = -7 \Rightarrow y = -5$

b) $\begin{bmatrix} 2x+3 & 13 \end{bmatrix} = \begin{bmatrix} 11 & 9 \end{bmatrix}$

impossible

c) $\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

impossible
(different sizes)

16.2 Matrix Multiplication

Dot product $\begin{bmatrix} 1 & 3 \end{bmatrix} \cdot \begin{bmatrix} 1 \\ 5 \end{bmatrix}$

$= 1(1) + 3(5)$

$= 16$

$\begin{bmatrix} 1 & 4 & 1 \end{bmatrix} \cdot \begin{bmatrix} -1 \\ 6 \\ 2 \end{bmatrix}$

$= (1)(-1) + (4)(6) + (1)(2)$

$= 25$

Ex: $A = \begin{bmatrix} 4 & 6 & 1 \\ 0 & 2 & 3 \\ 1 & 1 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 0 \\ 1 & 1 \\ 2 & 3 \end{bmatrix}$

Find AB

$$AB = \begin{bmatrix} r_1 \cdot c_1 & r_1 \cdot c_2 \\ r_2 \cdot c_1 & r_2 \cdot c_2 \\ r_3 \cdot c_1 & r_3 \cdot c_2 \end{bmatrix}$$

$[4\ 6\ 1] \cdot \begin{bmatrix} 1 \\ 1 \\ 2 \end{bmatrix}$

$4(0) + 6(1) + 1(3)$

$$= \begin{bmatrix} 12 & 9 \\ 8 & 11 \\ 4 & 4 \end{bmatrix}$$