Make sure your class notes and homework solutions are loaded in your PDF. It's best to write small so there are no issues with big file sizes.

Section 3.2:

1 is called the multiplicative identity b/c a· 1=a. So multiplying by 1 doesn't change the value of a

ex1: $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 1\cdot1+2\cdot0 & 1\cdot0+2\cdot1 \\ 3\cdot1+4\cdot0 & 3\cdot0+4\cdot1 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ ⇐ same matrix comes out

$2\times2 \qquad 2\times2$

We call $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ the identity matrix = I_2

ex2: $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 1\cdot1+2\cdot0+3\cdot0 & 1\cdot0+2\cdot1+3\cdot0 & 3\cdot1 \\ 4\cdot1+5\cdot0+6\cdot0 & 4\cdot0+5\cdot1+6\cdot0 & 4\cdot0+5\cdot0+6\cdot1 \\ 7\cdot1+8\cdot0+9\cdot0 & 7\cdot0+8\cdot1+9\cdot0 & 7\cdot0+8\cdot0+9\cdot1 \end{bmatrix}$

$3\times3 \qquad 3\times3$

$= \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$ ⇐ We have the same as the original matrix output!

We call $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ the identity matrix for 3 by 3 matrices. I_3

Example 10/Page 129:

The price per share for Wal-Mart (WMT), Target(TGT) and Costco(Cost) common stock at the close of trading on November 1st of 2007 and 2008 and 2009 are shown in the matrix A.

For 2007: we have three prices. For 2008, we again have three prices. For 2009, we again have three prices.

	WMT	TGT	COST
2007	42.16	56.58	63.17
2008	54.54	39.24	56.03
2009	50.03	49.17	57.75

3×3 A

Kathleen and Shannon have each kept constant numbers of shares of each.

	Kath.	Shannon
WMT	150	125
TGT	100	75
COST	50	100

B

3×2

$$AB = \begin{bmatrix} 42.16 & 56.58 & 63.17 \\ 54.54 & 39.24 & 56.03 \\ 50.03 & 49.17 & 57.75 \end{bmatrix}\begin{bmatrix} 150 & 125 \\ 100 & 75 \\ 50 & 100 \end{bmatrix} = \begin{bmatrix} 42.16\cdot150+56.58\cdot100+63.17\cdot50 & 42.16\cdot125+56.58\cdot75+63.17\cdot100 \\ 54.54\cdot150+39.24\cdot100+56.03\cdot50 & 54.54\cdot125+39.24\cdot75+56.03\cdot100 \\ 50.03\cdot150+49.17\cdot100+57.75\cdot50 & 50.03\cdot125+49.17\cdot75+57.75\cdot100 \end{bmatrix}$$

Wal Tar Cos K S

	K	S
2007	\$15, 140.50	\$15, 830.50
2008	\$14, 906.50	\$15, 363.50
2009	\$15, 309.00	\$15, 716.50

Focus on (for no reason) $15, 830.50 : this is the total investment value for Shannon in 2007.

Example 11/Page 130:

$$\begin{bmatrix} & JJC & CSU \\ \text{Margareta} & 12 & 3 \\ Emilio & 9 & 6 \end{bmatrix}$$

credit hours at Chicago State and Joliet Junior College

$$\begin{bmatrix} & cost \text{ per credit hour} \\ JJC & 73 \\ CSU & 189 \end{bmatrix}$$

cost per credit hour for each university!

$$A=\begin{bmatrix} 12 & 3 \\ 9 & 6 \end{bmatrix}$$

2by2

$$B=\begin{bmatrix} 73 \\ 189 \end{bmatrix}$$

2×1

inside numbers are same,
so we can multiply. Result will be
2 by 1 according to the outside numbers.

$$AB=\begin{bmatrix} 12 & 3 \\ 9 & 6 \end{bmatrix}\begin{bmatrix} 73 \\ 189 \end{bmatrix}=\begin{bmatrix} 12\cdot 73+3\cdot 189 \\ 9\cdot 73+6\cdot 189 \end{bmatrix}=\begin{bmatrix} 1443 \\ 1791 \end{bmatrix}$$

The 1443 is Margareta's cost to take her 15 credit hours.
The 1791 *is* Emilio's cost to take his 15 credit hours.

Question 1 Homework:
Table:
A brass maker makes three different types of wholesale brass blocks from copper and zinc according to the following table:

	Brass Blends			
	High Brass	Muntz Metal	Gilding Metal	
Co pper	65%	60%	95%	
Zinc	35%	40%	5%	
	100%	100%	100%	not part of matrix

(a)Make a 2 by3 matrix B that contains the blending information in decimal form:

$$B=\begin{pmatrix} 0.65 & 0.60 & 0.95 \\ 0.35 & 0.40 & 0.05 \end{pmatrix} \quad 2\times 3$$

(b) Plant 1 needs 8 High Brass, 3 Muntz Metal and 26 Gilding metal(in 1000's of lbs)
Plan 2 needs 10 High Brass, 5 Muntz Metal, 32 Gilding metal (32=32,000 lbs of Gilding M)

So we need a 3 by 2 so rows and columns match for multiplication: (We don't want 2 by 3)

$$\begin{bmatrix} 8 & 10 \\ 3 & 5 \\ 26 & 32 \end{bmatrix}$$

Pl. 1 Pl.2 3×2

(c) Find the amtrix product to find each location's need for each type of metal:

$$\begin{bmatrix} 0.65\cdot 8+0.60\cdot 3+0.95\cdot 26 & 0.65\cdot 10+0.60\cdot 3+0.95\cdot 26 \\ 0.35\cdot 8+0.40\cdot 3+0.95\cdot 26 & 0.35\cdot 10+0.40\cdot 5+0.05\cdot 32 \end{bmatrix}$$

$$\begin{matrix} \text{copper} \\ zinc \end{matrix} = \begin{bmatrix} 31.7 & 39.9 \\ 5.3 & 7.1 \end{bmatrix}$$

(d) Zinc is $.96 per pound and the price of copper is $3.26 per pound.

each entry represents the demand PL1 PL2

Total cost of Plant 1 is : $3.26 \cdot 31.7 \cdot 1000 + 0.96 \cdot 5.3 \cdot 1000 = \$108,430.00$

Total cost of Plant 2 is: $3.26 \cdot 39.9 \cdot 1000 + 0.96 \cdot 7.1 \cdot 1000 = \$136,890.00$