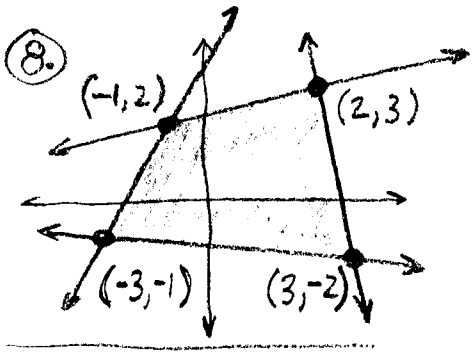
BE - Alg. 2 WEDNESDAY 9-28-11

3 min ACT ⇒ 3 problems ⇒ Linear Programming

- Homework review: Pg 132 # 8, 19
  Pg 156 # 1, 6, 7, 10-15

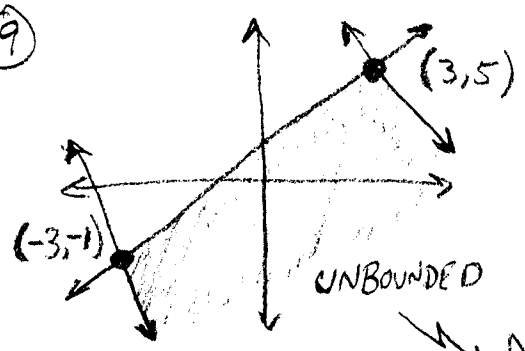
8.



$f(3,-2) = 5 = MAX$

$f(-1,2) = -3 = MIN$

19



$f(x,y)$ keeps ↑

No maximum

$f(-3,-1) = -9 = MIN$

(1) Same dimensions, corresponding elements equal.

(6) (5,6) (7) (3,3) (10) 2×3 (11) 3×1

(12) 4×3 (13) 3×3 (14) 2×5 (15) 3×2

Ch. 4-2 Operations with Matrices

ADD/SUBTRACT ⇒ +/− corresponding elements.

+/− two matrices of different dimensions is undefined.

(Ex) $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ $B = \begin{bmatrix} 5 & 6 \\ 7 & -8 \end{bmatrix}$ $A+B = \begin{bmatrix} 6 & 8 \\ 10 & -4 \end{bmatrix}$

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

Scalar = A number

Multiplying A matrix by a scalar:

(Ex) $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ $3A = \begin{bmatrix} 3 & 6 \\ 9 & 12 \end{bmatrix}$

(Ex) $5A - 2B = \begin{bmatrix} 5 & 10 \\ 15 & 20 \end{bmatrix} - \begin{bmatrix} 10 & 12 \\ 14 & -16 \end{bmatrix} = \begin{bmatrix} -5 & -2 \\ 1 & 36 \end{bmatrix}$

$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ $B = \begin{bmatrix} 5 & 6 \\ 7 & -8 \end{bmatrix}$

Multiply Matrices ⇒ Ch. 4-3

- Can only multiply if columns of 1st matrix = rows of second matrix!

(Ex) $[3\times 2]\cdot[2\times 4]$ OK

columns = rows

$[3\times 2]\cdot[3\times 3]$ NOT DEFINED

columns ≠ rows

- Dimensions of Product Matric will be same as Rows of FIRST × cols of 2nd

(Ex) $[3\times 2]\cdot[2\times 4]=[3\times 4]$

Rows of 1st — cols of 2nd

How to Multiply:

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix} \cdot \begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \end{bmatrix}$$

Check:

$3\times 2 \cdot 2\times 4$ ✓

Result

3×4

Tip 2nd matrix on end – multiply & add as shown

$$\begin{matrix} 4 & 8 \\ 3 & 7 \\ 2 & 6 \\ 1 & 5 \end{matrix} \rightarrow$$

$$\downarrow$$

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix} \Rightarrow \begin{bmatrix} (1\cdot 1)+(2\cdot 5) & (1\cdot 2)+(2\cdot 6) & (1\cdot 3)+(2\cdot 7) & (1\cdot 4)+(2\cdot 8) \\ (3\cdot 1)+(4\cdot 5) & (3\cdot 2)+(4\cdot 6) & (3\cdot 3)+(4\cdot 7) & (3\cdot 4)+(4\cdot 8) \\ (5\cdot 1)+(6\cdot 5) & (5\cdot 2)+(6\cdot 6) & (5\cdot 3)+(6\cdot 7) & (5\cdot 4)+(6\cdot 8) \end{bmatrix}$$

$$\Rightarrow \begin{bmatrix} 11 & 14 & 17 & 20 \\ 23 & 30 & 37 & 44 \\ 35 & 46 & 57 & 68 \end{bmatrix} \leftarrow \text{Ans}$$

Ch 4-5 Determinants

Symbol for matrix $\begin{bmatrix} 2 & 4 \\ 6 & 8 \end{bmatrix} = A$

$\begin{vmatrix} 2 & 4 \\ 6 & 8 \end{vmatrix}$ means the determinant of A

The determinant of a matrix is a single number — it is a basic property of a matrix.

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* The determinant is only defined for square matrices

$$\begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc$$

Memory aid ⇒ use ⊕ ↘ and ↙ ⊖ diagonals

(ex)

$$\begin{vmatrix} 2 & 4 \\ 6 & 8 \end{vmatrix} = +(2 \cdot 8) - (4 \cdot 6)$$

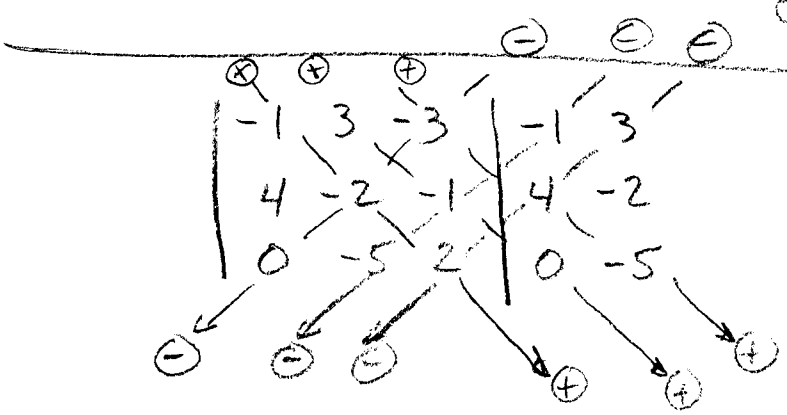
$$= 16 - 24 = \boxed{-8}$$

The determinant of a 3×3

(EX) Ex 3 Pg 194

$$\begin{vmatrix} -1 & 3 & -3 \\ 4 & -2 & -1 \\ 0 & -5 & 2 \end{vmatrix}$$

Repeat 1st 2 columns and draw 3 ⊕ diagonals and 3 ⊖ diagonals



OPEN 3 +( ) and 3 −( ) ⇒ PUT IN PRODUCTS

$$+(-1\cdot-2\cdot2) + (3\cdot-1\cdot0) + (-3\cdot4\cdot-5) - (-3\cdot-2\cdot0) - (-1\cdot-1\cdot-5) - (3\cdot4\cdot2)$$

$$+(4) + (0) + (60) - (0) + (-5) - (24)$$

$$69 - 24 = \boxed{45}$$

Homework:

Ch. 4-2	Ch. 4-3	Ch 4-5
Pg 164	Pg 171	Pg 172
#14, 15, 19	#4-8	#15-18, #27