V1 10

Total Points

Quiz / [illegible]

Nelson

Hw 5-1

1 a) $a_{11} = 1$

b) $a_{13} = 5$

c) $a_{31} = 2$

d) $\sum_{a=1}^{3} = 1 + -2 + 1 = 0$

3) a) $A^T \to$ Transpose

$$A^T = \begin{bmatrix} -1 & 1 & 4 \\ 0 & 3 & 2 \\ 2 & -2 & 3 \end{bmatrix}$$

b) $\begin{bmatrix} 1 & 2 & 5 \\ 3 & -4 & -2 \end{bmatrix} = C^t$

c) $A+B = \begin{bmatrix} -1+6 & 0+8 & 7 \\ 5 & 1 & 5 \\ 7 & 3 & 5 \end{bmatrix} = \begin{bmatrix} 5 & 8 & 7 \\ 5 & 1 & 5 \\ 7 & 3 & 5 \end{bmatrix}$

d) This cannot be done A is 3x3 ; C is 3x2

e) $\begin{bmatrix} 5 & 5 & 7 \\ 8 & 1 & 3 \\ 7 & 5 & 5 \end{bmatrix} = (A+B)^t$

f) $a^t + B^t = \begin{bmatrix} 6+-1 & 4+1 & 3+4 \\ 0+8 & -2+3 & 2+1 \\ 2+5 & -2+7 & 2+3 \end{bmatrix}$

$$a^t + B^t = \begin{bmatrix} 5 & 5 & 7 \\ 8 & 1 & 3 \\ 7 & 5 & 5 \end{bmatrix}$$

g) $\begin{bmatrix} 6 \cdot 2 & 4+8 & 3+5 \\ 8+4 & -2 \cdot 2 & 1+7 \\ 3+5 & 4+8 & 2 \cdot 2 \end{bmatrix} = B + B^t$

$$\begin{bmatrix} 12 & 12 & 8 \\ 12 & -4 & 8 \\ 8 & 12 & 4 \end{bmatrix} = B + B^t$$

b)

$C + C^t =$ Incompatible C is 3×2 while C^t is 2×3

(4) a) b)

a) $\begin{bmatrix} -2 & 0 & 4 \\ 2 & 6 & -4 \\ 8 & 4 & 6 \end{bmatrix} = A + A$

b) same as above

5) a de

odd = 0 e = even)

a) $\begin{bmatrix} \boxed{e}\ 1 & \boxed{o}\ -1 & \boxed{e}\ 1 \\ \boxed{o}\ -1 & \boxed{e}\ 1 & \boxed{o}\ -1 \\ \boxed{e}\ 1 & \boxed{o}\ -1 & \boxed{e}\ 1 \\ -1 & 1 & -1 \end{bmatrix}$

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

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

a) $A^t = \begin{bmatrix} 1 & -1 & 1 & -1 \\ -1 & 1 & -1 & 1 \\ 1 & -1 & 1 & -1 \end{bmatrix}$

d) $\begin{bmatrix} 3 & 2 & 5 \\ 2 & 5 & 4 \\ 5 & 4 & 7 \\ 4 & 5 & 6 \end{bmatrix}$

$a + B$

V' 10

Total Points

Nelson

HW5 -2

(e) $\begin{bmatrix} 3 & 2 & 5 & 4 \\ 2 & 5 & 4 & 5 \\ 5 & 4 & 7 & 6 \end{bmatrix}$

6 ?

7 A) $\begin{bmatrix} 3\cdot 1+9\cdot -2 & 3\cdot -3+9\cdot 6 \\ 1\cdot 1+3\cdot -2 & 1\cdot -3+3\cdot 6 \end{bmatrix} = AB$

$\begin{bmatrix} 3-18 & -9+54 \\ 1-6 & -3+18 \end{bmatrix} = \begin{bmatrix} -15 & 45 \\ -5 & 15 \end{bmatrix} = AB$

B

$BA = \begin{bmatrix} 1\cdot 3+-3\cdot 1 & 1\cdot 9+-3\cdot 3 \\ -2\cdot 3+6\cdot 1 & -2\cdot 9+6\cdot 3 \end{bmatrix}$

$BA = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

c $A^2 = \begin{bmatrix} 3\cdot 3+9\cdot 1 & 3\cdot 9+9\cdot 3 \\ 1\cdot 3+3\cdot 1 & 3\cdot 9+3\cdot 3 \end{bmatrix} = \begin{bmatrix} 18 & 54 \\ 6 & 18 \end{bmatrix}$

(d) $B^2 = \begin{bmatrix} 1\cdot 1+-3\cdot -2 & 1\cdot -3+-3\cdot 6 \\ -2\cdot 1+6\cdot -2 & -2\cdot -3+6\cdot 6 \end{bmatrix} = \begin{bmatrix} 7 & -21 \\ 14 & 42 \end{bmatrix}$

8 A $(A+B)^2$ $A+B = \begin{bmatrix} 4 & 6 \\ -1 & 9 \end{bmatrix}$

$(A+B)^2 = \begin{bmatrix} 4\cdot 4+6\cdot -1 & 4\cdot 6+6\cdot 9 \\ -1\cdot 4+9\cdot -1 & -1\cdot 6+9\cdot 9 \end{bmatrix}$

$(A+B)^2 = \begin{bmatrix} 10 & 78 \\ -13 & 75 \end{bmatrix}$

V1.10

Quiz (BUSN)

12) a)

$$A^2 = \begin{bmatrix} 18 & 54 \\ 6 & 18 \end{bmatrix} \quad B^2 = \begin{bmatrix} 7 & -21 \\ -14 & 42 \end{bmatrix} \quad AB = \begin{bmatrix} -15 & 45 \\ -5 & 15 \end{bmatrix}$$

$$A^2+B^2+2AB \begin{bmatrix} 18+7-15\cdot 2 & 54-21+45\cdot 2 \\ 6-14-5\cdot 2 & 18+42+15\cdot 2 \end{bmatrix} = \begin{bmatrix} -5 & 123 \\ -18 & 90 \end{bmatrix}$$

b) No

13) ABC $\quad c(aA+bB) = caA + cbB = (ca)A + (cb)B$

a) are equal

b) $-aA = (-a)A = a(-A)$

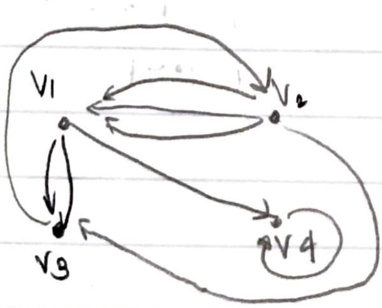
c) $(aA)^T = aA^T$

15) a) 4

16) A)

	V_1	V_2	V_3	V_4
V_1	2	1	1	0
V_2	1	1	0	0
V_3	1	0	0	1
V_4	0	0	1	0

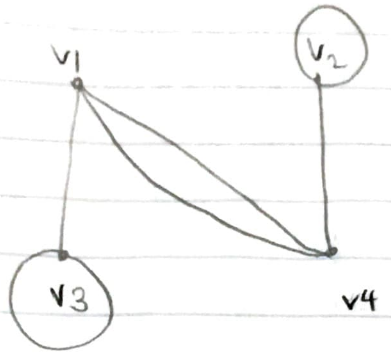
17) a



Nelson

HW5-3

8 b)



section 11.3

1 a $\begin{bmatrix} 1\cdot 2+2\cdot -1+4\cdot -2 & 1\cdot 1+2\cdot 0+4\cdot 3 \\ 3\cdot 2+0\cdot -1+2\cdot -2 & 3\cdot 1+0+2\cdot 3 \end{bmatrix}$

a) $\begin{bmatrix} -8 & 13 \\ 2 & 9 \end{bmatrix}$

B $BA = \begin{bmatrix} 2 & 1 \\ -1 & 0 \\ -2 & 3 \end{bmatrix} \begin{bmatrix} 1 & 2 & 4 \\ 3 & 0 & 2 \end{bmatrix}$

$= \begin{bmatrix} 2+3 & 4+0 & 8+2 \\ -1+0 & -2+0 & -4+0 \\ -2+3\cdot 3 & -4+0 & -8+6 \end{bmatrix}$

$= \begin{bmatrix} 5 & 4 & 10 \\ -1 & -2 & -4 \\ 7 & -4 & -2 \end{bmatrix}$

c

$= \begin{bmatrix} -8 & 13 \\ 2 & 9 \end{bmatrix} \cdot \begin{bmatrix} 1 & 2 & 4 \\ 3 & 0 & 2 \end{bmatrix}$

(AB)

$ABA = \begin{bmatrix} -8+13\cdot 3 & -16+0 & -8\cdot 4+13\cdot 2 \\ 2\cdot 1+9\cdot 3 & 2\cdot 2+9\cdot 0 & 2\cdot 4+9\cdot 2 \end{bmatrix} = \begin{bmatrix} 31 & -16 & -6 \\ 29 & 4 & 26 \end{bmatrix}$

V1.10

Total Poin

(d)

$$A + B^{+} = \begin{bmatrix} 1 & 2 & 4 \\ 3 & 0 & 2 \end{bmatrix} + \begin{bmatrix} 2 & -1 & -2 \\ 1 & 0 & 3 \end{bmatrix}$$

$$A + B^{T} = \begin{bmatrix} 3 & 1 & 2 \\ 4 & 0 & 5 \end{bmatrix}$$

(e) $$3A^{T} - 2B = 3\begin{bmatrix} 1 & 3 \\ 2 & 0 \\ 4 & 2 \end{bmatrix} - 2\begin{bmatrix} 2 & 1 \\ -1 & 0 \\ -2 & 3 \end{bmatrix}$$

$$3A^{T} - 2B = \begin{bmatrix} 3 & 9 \\ 6 & 0 \\ 12 & 6 \end{bmatrix} - \begin{bmatrix} 4 & 2 \\ -2 & 0 \\ -4 & 6 \end{bmatrix} = \begin{bmatrix} -1 & 7 \\ 8 & 0 \\ 16 & 0 \end{bmatrix}$$

(f) $$(AB)^2 \rightarrow AB = \begin{bmatrix} -8 & 13 \\ 2 & 9 \end{bmatrix}$$

$$AB^2 = \begin{bmatrix} -8 \cdot -8 + -13 \cdot 2 & -8 \cdot 13 + 13 \cdot 9 \\ 2 \cdot -8 + 9 \cdot 2 & 2 \cdot 13 + 9 \cdot 9 \end{bmatrix}$$

$$AB^2 = \begin{bmatrix} 90 & 13 \\ 2 & 107 \end{bmatrix}$$

3) A)

A^2 does not exists

B) $$B^2 = \begin{bmatrix} -1 & 1 & 0 \\ 1 & 2 & 1 \\ 0 & 1 & -1 \end{bmatrix} = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 6 & 1 \\ 1 & 1 & 2 \end{bmatrix}$$

c) AB does not exist

d) $$BA = \begin{bmatrix} -1 & 1 & 0 \\ 1 & 2 & 1 \\ 0 & 1 & -1 \end{bmatrix} \begin{bmatrix} 3 & -4 & 3 & 1 \\ 2 & 0 & 1 & -2 \\ -1 & 1 & 2 & 0 \end{bmatrix} = \begin{bmatrix} -1 & 4 & -2 & -3 \\ 6 & -3 & 7 & -3 \\ 3 & -1 & -1 & -2 \end{bmatrix}$$

V1.10

Total Poin

Quiz (BUSN)

Nelson

Hw 5-4

4 a $B = 3\times 3$

$A^t = 4\times 3$, thus, BA^T does not exist

$4\times 3 \times 3\times 3$

b $A^T B = \begin{bmatrix} 3 & 2 & -1 \\ -4 & 0 & 1 \\ 3 & 1 & 2 \\ 1 & -2 & 0 \end{bmatrix} \times \begin{bmatrix} -1 & 1 & 0 \\ 1 & 2 & 1 \\ 0 & 1 & -1 \end{bmatrix} = $

$\begin{bmatrix} 3\cdot -1+2 & 3+2-1 & \cancel{3\cdot 0}+2\cdot 1-1\cdot -1 \\ (-1) & (6) & (3) \\ -4+0\cdot 1+1\cdot 0 & -4\cdot 1+0\cdot 2+1 & \cancel{4}+0+1\cdot -1 \\ 3\cdot -1+1\cdot 1+2\cdot 0 & 3\cdot 1+1\cdot 2+2 & \cancel{3}+1+2\cdot -1 \\ 1\cdot -1-2\cdot 1+0 & 1\cdot 1-2\cdot 2+0 & \cancel{1}-2+0\cdot -1 \end{bmatrix} = \begin{bmatrix} -1 & 6 & 3 \\ 4 & -3 & -1 \\ -2 & 7 & -1 \\ -3 & -3 & -2 \end{bmatrix}$

c

$B^t \times A^t$

does not exist.

$3\times 3 \; 4\times 3$

11 (a) M^2, V_1 to itself is $\boxed{2}$ b) 9

(c) $\boxed{12}$ d) 0

13

a) ?

Nelson Wang Hw 5-5

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(a) Same → equivalence relations, (T), (R), (S),

(b) Not reflexive, not trasitive No equivalence, is symetric, Not trastive

(c) Not R, S, T, Not equivalence relation

(d) Not R, is S, Not T, Not equivalence relation

(e) is R, is S Not T, not equivalence relation

(f) is R, is S, is T, is an Equivalence Relation

2 a) L and M are parallel

b) No equivalence classs

c) No

d) No

e) No

f) $cl(P) = \{q \in S . q$ is the son of $P\}$

7 a) (R)(S) (T) (e)

b) $m^2 = n^2$

$m^2 - n^2$

$(m+n)(m-n) = 0$

$m = \pm n \to \boxed{2}$

9 a) $g(n) = |n|$

$\boxed{\{0\}, \{n, -n\}, n \in \mathbb{Z}}$

$cl(0) = \{0\}$

$cl(n) = \{n, -n\}$

b) $h(n) = 1 + (-1)^n$

$m = 2p, p \in \mathbb{Z}$

$cl(m = 2p) = \{2\}$

$cl(n = 2p+1) = \{0\}$

$\to \{2;$ when $m = 2p, p \in \mathbb{Z}\}$,

$\{0,$ when $m = 2p+1, p \in \mathbb{Z}\}$

10) a) R $m+l=n+k$

$m+l=n+k$

$m+l=n+k$

$k+n=l+m$ thus is (S)

$m+l=n+k$ | is transitive

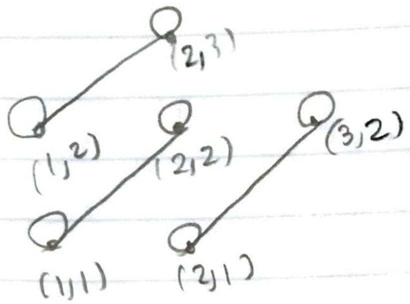
$k+q=l+p$ | is an equivalence relation

$(m+l)+(k+q)=(n+k)+(l+p)$

$(m+q)+(l+k)=(n+p)+(l+k)$

$m+q=n+p$

$(1,1),(1,2),(2,2),(2,1)$



11)