CS 132 Assignment5

Gordon Ng

TOTAL POINTS

85.5 / 96

QUESTION 1

6 pts

1.1 2 / 2

✓ **- 0 pts Correct**

- 1 pts Incorrect Explanation

- 2 pts Incorrect/No Explanation

1.2 2 / 2

✓ **- 0 pts Correct**

- 1 pts Incorrect Explanation

- 2 pts No Explanation/Incorrect Answer

1.3 2 / 2

✓ **- 0 pts Correct**

- 1 pts Incorrect Explanation

- 2 pts Incorrect Answer/No Explanation

QUESTION 2

10 pts

2.1 5 / 5

✓ **+ 5 pts Correct**

+ 4 pts Correct explanation

+ 2 pts Partial correct explanation

+ 1 pts Correct answer

+ 0 pts Missing or wrong answer

2.2 5 / 5

✓ **+ 5 pts Correct**

+ 4 pts Correct explanation

+ 2 pts Partial correct explanation

+ 1 pts Correct answer

+ 0 pts Missing or wrong answer

QUESTION 3

9 pts

3.1 3 / 3

✓ **- 0 pts Correct**

- 1 pts Incorrect B → C matrix

- 1 pts Incorrect C → B matrix

- 2 pts Partial correct explanation

- 3 pts Missing or wrong answer

3.2 3 / 3

✓ **- 0 pts Correct**

- 1 pts Incorrect B → C matrix

- 1 pts Incorrect C → B matrix

- 2 pts Partial correct explanation

- 3 pts Missing or wrong answer

3.3 3 / 3

✓ **- 0 pts Correct**

- 1 pts Incorrect B → C matrix

- 1 pts Incorrect C → B matrix

- 2 pts Partial correct explanation

- 3 pts Missing or wrong answer

QUESTION 4

4 0 / 5

- 0 pts Correct

- 2.5 pts Incorrect Answer

✓ **- 5 pts Incorrect**

- 1 pts Pages Not Selected

QUESTION 5

5 2.5 / 5

- 0 pts Correct

✓ **- 2.5 pts Incorrect**

- 5 pts Incorrect

- 1 pts Pages Not Selected

QUESTION 6

6 pts

6.1 3 / 3

✓ **- 0 pts** **Correct**

- 3 pts Incorrect / No solution

6.2 3 / 3

✓ **- 0 pts** **Correct**

- 3 pts Incorrect / No answer

QUESTION 7

7 5 / 5

✓ **- 0 pts** **Correct**

- 2 pts Did not identify that S must span V and be linearly independent

- 1 pts Did not show that S spans V

- 2 pts Did not prove that S is linearly independent

QUESTION 8

8 5 / 5

✓ **+ 5 pts** **Correct**

+ 4 pts Close but not completely correct

+ 2 pts An attempt was made

+ 0 pts No attempt was made

QUESTION 9

9 5 / 5

✓ **- 0 pts** **Correct**

- 2 pts Incorrect det B

- 2 pts Incorrect (det B)^4

- 1 pts Incorrect final answer

QUESTION 10

10 pts

10.1 2 / 2

✓ **- 0 pts** **Correct**

- 1 pts Incorrect implementation of rule

- 1 pts Incorrect final answer

10.2 1 / 2

- 0 pts Correct

✓ **- 1 pts** **Incorrect implementation of rule**

- 1 pts Incorrect final answer

10.3 2 / 2

✓ **- 0 pts** **Correct**

- 1 pts Incorrect implementation of rule

- 1 pts Incorrect final answer

10.4 0 / 2

- 0 pts Correct

✓ **- 1 pts** **Incorrect implementation of rule**

✓ **- 1 pts** **Incorrect final answer**

10.5 2 / 2

✓ **- 0 pts** **Correct**

- 1 pts Incorrect implementation of rule

- 1 pts Incorrect final answer

QUESTION 11

9 pts

11.1 3 / 3

✓ **- 0 pts** **Correct**

- 2 pts Incorrect implementation of rule

- 1 pts Incorrect final answer

11.2 3 / 3

✓ **- 0 pts** **Correct**

- 2 pts Incorrect implementation of rule

- 1 pts Incorrect final answer

11.3 3 / 3

✓ **- 0 pts** **Correct**

- 2 pts Incorrect implementation of rule

- 1 pts Incorrect final answer

QUESTION 12

6 pts

12.1 3 / 3

✓ **- 0 pts** **Correct**

- 3 pts Incorrect / No answer

12.2 3 / 3

✓ **- 0 pts** Correct

- 3 pts Incorrect / No answer

QUESTION 13

13 5 / 5

✓ **- 0 pts** Correct

- 2.5 pts Incorrect

- 5 pts Incorrect

- 1 pts Pages Not Selected

QUESTION 14

14 10 / 10

✓ **- 0 pts** Correct

- 10 pts No answer

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ments/282739/submissions/23481130#Question_4

4. In a set of all matrixes (addition + multiplication),

a) ~~ido~~ invertible matrixes

No $A = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ $B = \begin{pmatrix} 8 & 6 \\ 12 & 7 \end{pmatrix}$ $A+B = \begin{pmatrix} 9 & 6 \\ 12 & 8 \end{pmatrix}$ which is not invertible

No. b) $\begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix} + \begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, $\begin{pmatrix} 5 & 0 \\ 0 & 0 \end{pmatrix} + \begin{pmatrix} 0 & 7 \\ 0 & 0 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 0 & 0 \end{pmatrix}$ is not singular

Yes c) $A = \begin{bmatrix} 3 & -2 & 4 \\ -2 & 6 & 2 \\ 4 & 2 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 0 & 5 \\ 0 & 1 & 0 \\ 5 & 0 & 1 \end{bmatrix}$ The addition of this would still be symmetric (or mult.) $A = A^T$ $(A+B)^T$ is $A+B$

5) $\begin{bmatrix} 3 & 5 & 0 & 0 & 0 \\ 1 & 2 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 \\ 0 & 0 & 0 & 7 & 8 \\ 0 & 0 & 0 & 5 & 6 \end{bmatrix}$ $\frac{1}{3}R_1 + R_2$ $-5/7\, R_4 + R_5$

$U = \begin{bmatrix} 3 & 5 & 0 & 0 & 0 \\ 0 & 1/3 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 \\ 0 & 0 & 0 & 7 & 8 \\ 0 & 0 & 0 & 0 & 7/2 \end{bmatrix}$ $L = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 1/3 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$

$\cancel{E^{-2}(E_1(E_2)A)^{-1}(U(E^{-1}E^{-2}))^{-1}}$

$A = U \cdot L$

$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1/3 & -5 & 0 & 0 & 0 \\ 0 & 3 & 0 & 0 & 0 \\ 0 & 0 & 1/2 & 0 & 0 \\ 0 & 0 & 0 & 1/2 & -4 \\ 0 & 0 & 0 & 0 & 7/2 \end{bmatrix}$

$A^{-1} = \begin{bmatrix} 1/3 & -5 & 0 & 0 & 0 \\ 0 & 3 & 0 & 0 & 0 \\ 0 & 0 & 1/2 & 0 & 0 \\ 0 & 0 & 0 & 1/2 & -4 \\ 0 & 0 & 0 & 0 & 7/2 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ -1/3 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & -7/2 & 1 \end{bmatrix} = \begin{bmatrix} 2 & -5 & 0 & 0 & 0 \\ -1 & 3 & 0 & 0 & 0 \\ 0 & 0 & 1/2 & 0 & 0 \\ 0 & 0 & 0 & 3 & -4 \\ 0 & 0 & 0 & -7/2 & 7/2 \end{bmatrix}$

1.1 2 / 2

✓ **- 0 pts** **Correct**

- 1 pts Incorrect Explanation

- 2 pts Incorrect/No Explanation

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ments/282739/submissions/23481130#Question_4

4. In a set of all matrixes (addition + multiplication),

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$U = \begin{bmatrix} 3 & 5 & 0 & 0 & 0 \\ 0 & 1/3 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 \\ 0 & 0 & 0 & 7 & 8 \\ 0 & 0 & 0 & 0 & 7/2 \end{bmatrix}$ $L = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 1/3 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$

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1.2 **2 / 2**

✓ **- 0 pts** **Correct**

- 1 pts Incorrect Explanation

- 2 pts No Explanation/Incorrect Answer

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$U = \begin{bmatrix} 3 & 5 & 0 & 0 & 0 \\ 0 & 1/3 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 \\ 0 & 0 & 0 & 7 & 8 \\ 0 & 0 & 0 & 0 & 7/2 \end{bmatrix}$ $L = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 1/3 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$

$\cancel{E^{-2}(E_1(E_2)A)^{-1}(U(E^{-1}E^{-2}))^{-1}}$

$A = U \cdot L$

$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1/3 & -5 & 0 & 0 & 0 \\ 0 & 3 & 0 & 0 & 0 \\ 0 & 0 & 1/2 & 0 & 0 \\ 0 & 0 & 0 & 1/2 & -4 \\ 0 & 0 & 0 & 0 & 7/2 \end{bmatrix}$

$A^{-1} = \begin{bmatrix} 1/3 & -5 & 0 & 0 & 0 \\ 0 & 3 & 0 & 0 & 0 \\ 0 & 0 & 1/2 & 0 & 0 \\ 0 & 0 & 0 & 1/2 & -4 \\ 0 & 0 & 0 & 0 & 7/2 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ -1/3 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & -7/2 & 1 \end{bmatrix} = \begin{bmatrix} 2 & -5 & 0 & 0 & 0 \\ -1 & 3 & 0 & 0 & 0 \\ 0 & 0 & 1/2 & 0 & 0 \\ 0 & 0 & 0 & 3 & -4 \\ 0 & 0 & 0 & -7/2 & 7/2 \end{bmatrix}$

1.3 **2 / 2**

✓ **- 0 pts** **Correct**

- 1 pts Incorrect Explanation

- 2 pts Incorrect Answer/No Explanation

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2a

$$P = \begin{bmatrix} 1 & 2 & -1 \\ -3 & 5 & 0 \\ 4 & 6 & 1 \end{bmatrix} \quad v_1 = \begin{bmatrix} -2 \\ 2 \\ 3 \end{bmatrix} \quad v_2 = \begin{bmatrix} -8 \\ 5 \\ 2 \end{bmatrix} \quad v_3 = \begin{bmatrix} -7 \\ 2 \\ 6 \end{bmatrix}$$

$$\underset{SB \leftarrow v}{A} \begin{bmatrix} P \\ v \leftarrow u \end{bmatrix}_u$$

$$\begin{bmatrix} 1 & 2 & -1 \\ -3 & 5 & 0 \\ 4 & 6 & 1 \end{bmatrix} \times \begin{bmatrix} -2 & -8 & -7 \\ 2 & 5 & 2 \\ 3 & 2 & 6 \end{bmatrix} = \cancel{\begin{bmatrix} 1 & 0 & -1 \\ 16 & 49 & 31 \\ 7 & 0 & -10 \end{bmatrix}} \quad \begin{bmatrix} -6 & -86 & -5 \\ -5 & 41 & 0 \\ 21 & 52 & 3 \end{bmatrix}$$

2b.

$$\underset{SB \leftarrow u}{A} \begin{bmatrix} P \\ u \leftarrow v \end{bmatrix}_v \qquad v_W \quad \boxed{w_{SB}} \quad v_{SB} \qquad w_{SB} \quad w_v \quad v_{SB}$$

$$\begin{bmatrix} 1 & 2 & -1 \\ -3 & 5 & 0 \\ 4 & 6 & 1 \end{bmatrix}^{-1} = \cancel{\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}} = \begin{bmatrix} 0.1020 & -0.1633 & 0.1020 \\ 0.0612 & 0.1020 & 0.0612 \\ -0.7755 & 0.0408 & 0.2245 \end{bmatrix} \times \underset{SB \leftarrow v}{A}$$

$$\begin{bmatrix} 4.7347 & -0.7755 & -2.2653 \\ -1.0408 & 0.2653 & 0.9592 \\ -4.2245 & -0.0408 & 1.7755 \end{bmatrix}$$

2.1 **5 / 5**

✓ + **5 pts** **Correct**

+ **4 pts** Correct explanation

+ **2 pts** Partial correct explanation

+ **1 pts** Correct answer

+ **0 pts** Missing or wrong answer

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2a

$$P = \begin{bmatrix} 1 & 2 & -1 \\ -3 & 5 & 0 \\ 4 & 6 & 1 \end{bmatrix} \quad v_1 = \begin{bmatrix} -2 \\ 2 \\ 3 \end{bmatrix} \quad v_2 = \begin{bmatrix} -8 \\ 5 \\ 2 \end{bmatrix} \quad v_3 = \begin{bmatrix} -7 \\ 2 \\ 6 \end{bmatrix}$$

$$\underset{SB \leftarrow v}{A} \begin{bmatrix} P \\ v \leftarrow u \end{bmatrix}_u$$

$$\begin{bmatrix} 1 & 2 & -1 \\ -3 & 5 & 0 \\ 4 & 6 & 1 \end{bmatrix} \times \begin{bmatrix} -2 & -8 & -7 \\ 2 & 5 & 2 \\ 3 & 2 & 6 \end{bmatrix} = \cancel{\begin{bmatrix} 1 & 0 & -1 \\ 16 & 49 & 31 \\ 7 & 0 & -10 \end{bmatrix}} \quad \begin{bmatrix} -6 & -86 & -5 \\ -5 & 41 & 0 \\ 21 & 52 & 3 \end{bmatrix}$$

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$$\begin{bmatrix} 4.7347 & -0.7755 & -2.2653 \\ -1.0408 & 0.2653 & 0.9592 \\ -4.2245 & -0.0408 & 1.7755 \end{bmatrix}$$

2.2 **5 / 5**

✓ + **5 pts** **Correct**

+ **4 pts** Correct explanation

+ **2 pts** Partial correct explanation

+ **1 pts** Correct answer

+ **0 pts** Missing or wrong answer

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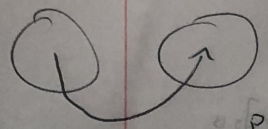

$$\underset{B\to C}{P} = \left[[B_1]_C \; [B_2]_C \right]$$

$$\underset{C\to SB}{A} \; [b_1]_C = [b_1]_{SB}$$

$$A = \left[[c_1]_{SB} \; [c_2]_{SB} \right]$$

3a. $\underset{B\leftarrow C}{P}$

$$B = \begin{array}{c} \begin{array}{cc} b_1 & b_2 \end{array} \\ \begin{bmatrix} 7 & -3 \\ 5 & 1 \end{bmatrix} \end{array} \quad C = \begin{array}{c} \begin{array}{cc} c_1 & c_2 \end{array} \\ \begin{bmatrix} 1 & -2 \\ -5 & 2 \end{bmatrix} \end{array}$$

$$\underset{B\leftarrow C}{P} = \text{inv}(C) * B = \begin{bmatrix} 0.6364 & 0.1818 \\ -1.8182 & 1.0909 \end{bmatrix}$$

$$\underset{C\leftarrow B}{P} = \text{inv}(B) * C = \begin{bmatrix} -3.0 & 0.50 \\ -5.0 & 1.75 \end{bmatrix}$$

3b. $B = \begin{bmatrix} -1 & -1 \\ 8 & -5 \end{bmatrix} \quad C = \begin{bmatrix} 1 & 1 \\ 4 & 1 \end{bmatrix}$

$$\underset{B\leftarrow C}{P} = \text{inv}(C) * B = \begin{bmatrix} 3.0 & -1.1/3 \\ -4.0 & 1/3 \end{bmatrix}$$

$$\underset{C\leftarrow B}{P} = \text{inv}(B) * C = \begin{bmatrix} -0.0769 & -0.3077 \\ -0.4231 & -0.6923 \end{bmatrix}$$

3c. $B = \begin{bmatrix} -6 & 2 \\ 1 & 0 \end{bmatrix} \quad C = \begin{bmatrix} 2 & 6 \\ -1 & -2 \end{bmatrix}$

$$\underset{B\leftarrow C}{P} = \text{inv}(C) * B = \begin{bmatrix} 3.0 & -2.0 \\ -2.0 & 1.0 \end{bmatrix}$$

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4.

$$B = \begin{bmatrix} 1\times b_1 & 0\times b_2 & 0\times b_2 \\ 1-2t+t^2, & 3-5t+4t^2, & 2t+3t^2 \\ b_1, & b_2, & b_3 \end{bmatrix} \quad C = \begin{bmatrix} 1, & t, & t^2 \end{bmatrix}$$

$b_1 \times 1$

$$[b_1]_C = \begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix} \quad [b_1]_B = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \quad [b_2]_C = \begin{bmatrix} 3 \\ -5 \\ 4 \end{bmatrix} \quad [b_3]_C = \begin{bmatrix} 0 \\ 2 \\ 3 \end{bmatrix} \quad \begin{bmatrix} -1 \\ 2 \\ 6 \end{bmatrix}_C$$

$$B^{-1} = \begin{bmatrix} [b_1]_C & [b_2]_C & [b_3] \\ [& &] \end{bmatrix}^{-1}$$

$$\underset{C\to B}{B^{-1}} \cdot \begin{bmatrix} -1 \\ 2 \\ 0 \end{bmatrix}_C = \begin{bmatrix} -2.2 \\ 0.4 \\ 0.2 \end{bmatrix}$$

3.1 **3 / 3**

✓ **- 0 pts** **Correct**

- 1 pts Incorrect B → C matrix

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- 3 pts Missing or wrong answer

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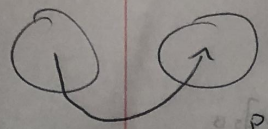

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4.

$$B = \begin{bmatrix} 1\times b_1 & 0\times b_2 & 0\times b_2 \\ 1-2t+t^2, & 3-5t+4t^2, & 2t+3t^2 \\ b_1, & b_2, & b_3 \end{bmatrix} \quad C = \begin{bmatrix} 1, & t, & t^2 \end{bmatrix}$$

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3.2 3 / 3

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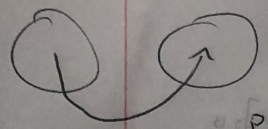

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$$A = \left[[c_1]_{SB} \; [c_2]_{SB} \right]$$

3a. $\underset{B\leftarrow C}{P}$

$$B = \begin{array}{c} \begin{array}{cc} b_1 & b_2 \end{array} \\ \begin{bmatrix} 7 & -3 \\ 5 & 1 \end{bmatrix} \end{array} \quad C = \begin{array}{c} \begin{array}{cc} c_1 & c_2 \end{array} \\ \begin{bmatrix} 1 & -2 \\ -5 & 2 \end{bmatrix} \end{array}$$

$$\underset{B\leftarrow C}{P} = \text{inv}(C) * B = \begin{bmatrix} 0.6364 & 0.1818 \\ -1.8182 & 1.0909 \end{bmatrix}$$

$$\underset{C\leftarrow B}{P} = \text{inv}(B) * C = \begin{bmatrix} -3.0 & 0.50 \\ -5.0 & 1.75 \end{bmatrix}$$

3b. $B = \begin{bmatrix} -1 & -1 \\ 8 & -5 \end{bmatrix} \quad C = \begin{bmatrix} 1 & 1 \\ 4 & 1 \end{bmatrix}$

$$\underset{B\leftarrow C}{P} = \text{inv}(C) * B = \begin{bmatrix} 3.0 & -1.1/3 \\ -4.0 & 1/3 \end{bmatrix}$$

$$\underset{C\leftarrow B}{P} = \text{inv}(B) * C = \begin{bmatrix} -0.0769 & -0.3077 \\ -0.4231 & -0.6923 \end{bmatrix}$$

3c. $B = \begin{bmatrix} -6 & 2 \\ 1 & 0 \end{bmatrix} \quad C = \begin{bmatrix} 2 & 6 \\ -1 & -2 \end{bmatrix}$

$$\underset{B\leftarrow C}{P} = \text{inv}(C) * B = \begin{bmatrix} 3.0 & -2.0 \\ -2.0 & 1.0 \end{bmatrix}$$

$$\underset{C\leftarrow B}{P} = \text{inv}(B) * C = \begin{bmatrix} -1 & -2 \\ -2 & -3 \end{bmatrix}$$

4.

$$B = \begin{bmatrix} 1\times b_1 & 0\times b_2 & 0\times b_2 \\ 1-2t+t^2, & 3-5t+4t^2, & 2t+3t^2 \\ b_1, & b_2, & b_3 \end{bmatrix} \quad C = \begin{bmatrix} 1, & t, & t^2 \end{bmatrix}$$

$b_1 \times 1$

$$[b_1]_C = \begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix} \quad [b_1]_B = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \quad [b_2]_C = \begin{bmatrix} 3 \\ -5 \\ 4 \end{bmatrix} \quad [b_3]_C = \begin{bmatrix} 0 \\ 2 \\ 3 \end{bmatrix} \quad \begin{bmatrix} -1 \\ 2 \\ 6 \end{bmatrix}_C$$

$$B^{-1} = \begin{bmatrix} [b_1]_C & [b_2]_C & [b_3] \\ [& &] \end{bmatrix}^{-1}$$

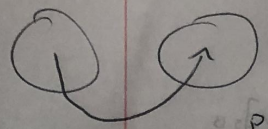
$$\underset{C\to B}{B^{-1}} \cdot \begin{bmatrix} -1 \\ 2 \\ 0 \end{bmatrix}_C = \begin{bmatrix} -2.2 \\ 0.4 \\ 0.2 \end{bmatrix}$$

3.3 3 / 3

✓ - 0 pts Correct

- 1 pts Incorrect B → C matrix
- 1 pts Incorrect C → B matrix
- 2 pts Partial correct explanation
- 3 pts Missing or wrong answer

gradescope



$$\underset{B\to C}{P} = \left[[B_1]_C \; [B_2]_C \right]$$

$$\underset{C\to SB}{A} \; [b_1]_C = [b_1]_{SB}$$

$$A = \left[[c_1]_{SB} \; [c_2]_{SB} \right]$$

3a. $\underset{B\leftarrow C}{P}$

$$B = \begin{array}{c} \begin{array}{cc} b_1 & b_2 \end{array} \\ \begin{bmatrix} 7 & -3 \\ 5 & 1 \end{bmatrix} \end{array} \quad C = \begin{array}{c} \begin{array}{cc} c_1 & c_2 \end{array} \\ \begin{bmatrix} 1 & -2 \\ -5 & 2 \end{bmatrix} \end{array}$$

$$\underset{B\leftarrow C}{P} = \text{inv}(C) * B = \begin{bmatrix} 0.6364 & 0.1818 \\ -1.8182 & 1.0909 \end{bmatrix}$$

$$\underset{C\leftarrow B}{P} = \text{inv}(B) * C = \begin{bmatrix} -3.0 & 0.50 \\ -5.0 & 1.75 \end{bmatrix}$$

3b. $B = \begin{bmatrix} -1 & -1 \\ 8 & -5 \end{bmatrix} \quad C = \begin{bmatrix} 1 & 1 \\ 4 & 1 \end{bmatrix}$

$$\underset{B\leftarrow C}{P} = \text{inv}(C) * B = \begin{bmatrix} 3.0 & -1.1/3 \\ -4.0 & 1/3 \end{bmatrix}$$

$$\underset{C\leftarrow B}{P} = \text{inv}(B) * C = \begin{bmatrix} -0.0769 & -0.3077 \\ -0.4231 & -0.6923 \end{bmatrix}$$

3c. $B = \begin{bmatrix} -6 & 2 \\ 1 & 0 \end{bmatrix} \quad C = \begin{bmatrix} 2 & 6 \\ -1 & -2 \end{bmatrix}$

$$\underset{B\leftarrow C}{P} = \text{inv}(C) * B = \begin{bmatrix} 3.0 & -2.0 \\ -2.0 & 1.0 \end{bmatrix}$$

$$\underset{C\leftarrow B}{P} = \text{inv}(B) * C = \begin{bmatrix} -1 & -2 \\ -2 & -3 \end{bmatrix}$$

4.

$$B = \begin{bmatrix} 1\times b_1 & 0\times b_2 & 0\times b_2 \\ 1-2t+t^2, & 3-5t+4t^2, & 2t+3t^2 \\ b_1, & b_2, & b_3 \end{bmatrix} \quad C = \begin{bmatrix} 1, & t, & t^2 \end{bmatrix}$$

$b_1 \times 1$

$$[b_1]_C = \begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix} \quad [b_1]_B = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \quad [b_2]_C = \begin{bmatrix} 3 \\ -5 \\ 4 \end{bmatrix} \quad [b_3]_C = \begin{bmatrix} 0 \\ 2 \\ 3 \end{bmatrix} \quad \begin{bmatrix} -1 \\ 2 \\ 6 \end{bmatrix}_C$$

$$B^{-1} = \begin{bmatrix} [b_1]_C & [b_2]_C & [b_3] \\ [& &] \end{bmatrix}^{-1}$$

$$\underset{C\to B}{B^{-1}} \cdot \begin{bmatrix} -1 \\ 2 \\ 0 \end{bmatrix}_C = \begin{bmatrix} -2.2 \\ 0.4 \\ 0.2 \end{bmatrix}$$

4 0 / 5

- **0 pts** Correct
- **2.5 pts** Incorrect Answer
- ✓ **- 5 pts** **Incorrect**
- **1 pts** Pages Not Selected

gradescope

5. $w = \begin{bmatrix} 1 \\ 1 \\ -1 \\ -3 \end{bmatrix}$ $A = \begin{bmatrix} 7 & 6 & -4 & 1 \\ -5 & -1 & 0 & -2 \\ 9 & -11 & 7 & -3 \\ 19 & -9 & 7 & 1 \end{bmatrix}$

$$c_1 \begin{bmatrix} 7 \\ -5 \\ 9 \\ 19 \end{bmatrix} + c_2 \begin{bmatrix} 6 \\ -1 \\ -11 \\ -9 \end{bmatrix} + c_3 \begin{bmatrix} -4 \\ 0 \\ 7 \\ 7 \end{bmatrix} + c_4 \begin{bmatrix} 1 \\ -2 \\ -3 \\ 1 \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ -1 \\ -3 \end{bmatrix}$$

$$\text{rref} = \begin{bmatrix} 1.0 & 0 & 0 & 0.38 & -0.20 \\ 0 & 1.0 & 0 & 0.0707 & 0.0289 \\ 0 & 0 & 1.0 & -0.81 & 0.1672 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

w is in A because the reduced echelon form has a solution.

6a) $\begin{bmatrix} 3+7t, 5+t-2t^3, t-2t^2, 1+16t-6t^2+2t^3 \end{bmatrix}$

$$c_1 \begin{bmatrix} 3 \\ 7 \\ 0 \\ 0 \end{bmatrix} + c_2 \begin{bmatrix} 5 \\ 1 \\ 0 \\ -2 \end{bmatrix} + c_3 \begin{bmatrix} 0 \\ 1 \\ -2 \\ 0 \end{bmatrix} + c_4 \begin{bmatrix} 1 \\ 16 \\ -6 \\ 2 \end{bmatrix}$$

$$\text{rref} = \left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & -1 & 0 \\ 0 & 0 & 1 & 3 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

x_4 is free variable, S is dependent, No basis.

5 2.5 / 5

- **0 pts** Correct
- ✓ **- 2.5 pts** **Incorrect**
- **5 pts** Incorrect
- **1 pts** Pages Not Selected

gradescope

5. $w = \begin{bmatrix} 1 \\ 1 \\ -1 \\ -3 \end{bmatrix}$ $A = \begin{bmatrix} 7 & 6 & -4 & 1 \\ -5 & -1 & 0 & -2 \\ 9 & -11 & 7 & -3 \\ 19 & -9 & 7 & 1 \end{bmatrix}$

$$c_1 \begin{bmatrix} 7 \\ -5 \\ 9 \\ 19 \end{bmatrix} + c_2 \begin{bmatrix} 6 \\ -1 \\ -11 \\ -9 \end{bmatrix} + c_3 \begin{bmatrix} -4 \\ 0 \\ 7 \\ 7 \end{bmatrix} + c_4 \begin{bmatrix} 1 \\ -2 \\ -3 \\ 1 \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ -1 \\ -3 \end{bmatrix}$$

$$\text{rref} = \begin{bmatrix} 1.0 & 0 & 0 & 0.38 & -0.20 \\ 0 & 1.0 & 0 & 0.0707 & 0.0289 \\ 0 & 0 & 1.0 & -0.81 & 0.1672 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

w is in A because the reduced echelon form has a solution.

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$$\text{rref} = \left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & -1 & 0 \\ 0 & 0 & 1 & 3 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

x_4 is free variable, S is dependent, No basis.

6.1 3 / 3

✓ **- 0 pts** Correct

- 3 pts Incorrect / No solution

gradescope

6) $[5-3t+4t^2+2t^3,\ 9+t+8t^2-6t^3,\ 6-2t+5t^2,\ t^3]$

$$c_1\begin{bmatrix}5\\-3\\4\\2\end{bmatrix}+c_2\begin{bmatrix}9\\1\\8\\-6\end{bmatrix}+c_3\begin{bmatrix}6\\-2\\5\\1\end{bmatrix}\quad \text{rref}(A)=\begin{bmatrix}1&0&0\\0&1&0\\0&0&1\\0&0&0\end{bmatrix}$$

rref ~~shows~~ linearly dependent
I + is a basis

7) S in V
x in V unique linear combination in S

Prove: ① S spans V and that ② S is linearly independent

① Since all x spans V and V is a unique linear combination in S, then ~~there is~~ ~~no vector combination~~ S spans V.

② S is linearly independent because V is a vector space with 0 vector so there are multiple solutions to this ~~vector~~ 0 vector, but since it is a unique combination from S, it is also linearly dependent.

Fin = S is a basis of V.

8) B is basis for V
for $[b_i]_B$ when $i=1,\dots,n$
$[b_i]_B = (0,1,\dots,0) = \vec{e}_i$
b_i will always be equal to 1, which makes it the basis vector.

9) $B=\begin{bmatrix}1&0&1\\1&1&2\\1&2&1\end{bmatrix}$ $\quad 1\begin{bmatrix}1&2\\2&1\end{bmatrix}-0\begin{bmatrix}1&2\\1&1\end{bmatrix}+1\begin{bmatrix}1&1\\1&2\end{bmatrix}$

$1(1-4)-0+1(2-1)\quad -3+1=\underbrace{-2\cdot-2}_{4}\cdot\underbrace{-2\cdot-2}_{4}$

det(B) = 16

6.2 3 / 3

✓ **- 0 pts** **Correct**

- 3 pts Incorrect / No answer

gradescope

6) $[5-3t+4t^2+2t^3,\ 9+t+8t^2-6t^3,\ 6-2t+5t^2,\ t^3]$

$$c_1\begin{bmatrix}5\\-3\\4\\2\end{bmatrix}+c_2\begin{bmatrix}9\\1\\8\\-6\end{bmatrix}+c_3\begin{bmatrix}6\\-2\\5\\1\end{bmatrix}\quad \text{rref}(A)=\begin{bmatrix}1&0&0\\0&1&0\\0&0&1\\0&0&0\end{bmatrix}$$

rref ~~shows~~ linearly dependent
I + is a basis

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x in V unique linear combination in S

Prove: ① S spans V and that ② S is linearly independent

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$1(1-4)-0+1(2-1)\quad -3+1=\underbrace{-2\cdot-2}_{4}\cdot\underbrace{-2\cdot-2}_{4}$

det(B) = 16

7 5 / 5

✓ **- 0 pts** Correct

- 2 pts Did not identify that S must span V and be linearly independent

- 1 pts Did not show that S spans V

- 2 pts Did not prove that S is linearly independent

gradescope

6) $[5-3t+4t^2+2t^3,\ 9+t+8t^2-6t^3,\ 6-2t+5t^2,\ t^3]$

$$c_1\begin{bmatrix}5\\-3\\4\\2\end{bmatrix}+c_2\begin{bmatrix}9\\1\\8\\-6\end{bmatrix}+c_3\begin{bmatrix}6\\-2\\5\\1\end{bmatrix}\quad \text{rref}(A)=\begin{bmatrix}1&0&0\\0&1&0\\0&0&1\\0&0&0\end{bmatrix}$$

rref ~~shows~~ linearly dependent
I + is a basis

7) S in V
x in V unique linear combination in S

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① Since all x spans V and V is a unique linear combination in S, then ~~there is~~ ~~no vector combination~~ S spans V.

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$[b_i]_B = (0,1,\dots,0) = \vec{e}_i$
b_i will always be equal to 1, which makes it the basis vector.

9) $B=\begin{bmatrix}1&0&1\\1&1&2\\1&2&1\end{bmatrix}$ $\quad 1\begin{bmatrix}1&2\\2&1\end{bmatrix}-0\begin{bmatrix}1&2\\1&1\end{bmatrix}+1\begin{bmatrix}1&1\\1&2\end{bmatrix}$

$1(1-4)-0+1(2-1)\quad -3+1=\underbrace{-2\cdot-2}_{4}\cdot\underbrace{-2\cdot-2}_{4}$

det(B) = 16

8 **5 / 5**

✓ + **5 pts** Correct

+ **4 pts** Close but not completely correct

+ **2 pts** An attempt was made

+ **0 pts** No attempt was made

gradescope

6) $[5-3t+4t^2+2t^3,\ 9+t+8t^2-6t^3,\ 6-2t+5t^2,\ t^3]$

$$c_1\begin{bmatrix}5\\-3\\4\\2\end{bmatrix}+c_2\begin{bmatrix}9\\1\\8\\-6\end{bmatrix}+c_3\begin{bmatrix}6\\-2\\5\\1\end{bmatrix}\quad \text{rref}(A)=\begin{bmatrix}1&0&0\\0&1&0\\0&0&1\\0&0&0\end{bmatrix}$$

rref ~~shows~~ linearly dependent
I + is a basis

7) S in V
x in V unique linear combination in S

Prove: ① S spans V and that ② S is linearly independent

① Since all x spans V and V is a unique linear combination in S, then ~~there is~~ ~~no vector combination~~ S spans V.

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9) $B=\begin{bmatrix}1&0&1\\1&1&2\\1&2&1\end{bmatrix}$ $\quad 1\begin{bmatrix}1&2\\2&1\end{bmatrix}-0\begin{bmatrix}1&2\\1&1\end{bmatrix}+1\begin{bmatrix}1&1\\1&2\end{bmatrix}$

$1(1-4)-0+1(2-1)\quad -3+1=\underbrace{-2\cdot-2}_{4}\cdot\underbrace{-2\cdot-2}_{4}$

det(B) = 16

9 **5 / 5**

✓ **- 0 pts** Correct

- 2 pts Incorrect det B

- 2 pts Incorrect (det B)^4

- 1 pts Incorrect final answer

gradescope

10)

a) -12 b) -15 c) 4 d) 3 e) -27

10) a) $\det(A)\cdot\det(B) = \det AB$

$-3 \cdot 4 = -12$

b) $\det(5A) = -3(5) = -15$

c) $\det B^T = \det B = 4$

d) $\det A^{-1} = (\det(A))^{-1} = 3$

e) $\det A^3 = (-3)^3 = -27$

11) ~~$a\cdot\begin{bmatrix} e & f \\ h & i \end{bmatrix} - b\begin{bmatrix} d & f \\ g & i \end{bmatrix} + c\begin{bmatrix} d & e \\ g & h \end{bmatrix}$~~ nope

~~$a(e\cdot i - h\cdot f) - b(d\cdot i - f\cdot g) + c(d\cdot h - g\cdot e) = 7$~~

1) if multiply column of A by a number, det will be mult by same.
2) if ith column in A is sum of ith column of B and ith column of C, $\det(A = \det(B) + \det(C)$
3) two columns of A are equal $\det(A) = 0$
4) if we add a scalar from one row to the another, det will not change
5) Swapping two rows will change $\det(A)$'s sign
6) $\det(A) = \det(A^T)$

a) $7\cdot 3 = 21$ b) $7\cdot 5 = 35$ c) 7

12a) $\begin{bmatrix} 3 & 4 & -3 & 1 \\ 3 & 0 & 1 & -3 \\ -6 & 0 & -4 & 3 \\ 6 & 8 & -4 & -1 \end{bmatrix}$ $4\cdot\begin{bmatrix} 3 & 1 & -3 \\ 6 & -4 & 3 \\ 6 & -4 & -1 \end{bmatrix} = \cancel{0} + 0 - 8\cdot\begin{bmatrix} 3 & -3 & 1 \\ 3 & 1 & -3 \\ -6 & -4 & 3 \end{bmatrix}$

$3\cdot\begin{bmatrix} -4 & 3 \\ -4 & -1 \end{bmatrix} - 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & -1 \end{bmatrix} + 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix}$ | $72 - 12 = \boxed{60}$

$3(\overset{4 - -12}{4 + 12}) - 6(-1+12) + 6(3+12) = 72$

$3(16) - 66 + 6(15)$

$3\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix} - 3\begin{bmatrix} -3 & 1 \\ -4 & 3 \end{bmatrix} + -6\begin{bmatrix} -3 & 1 \\ 1 & -3 \end{bmatrix}$

$3(3+12) - 3(-9+4) + -6(9-1) = (3\cdot 15) - (3(-5)) + -6(8) = 12$

10.1 **2 / 2**

✓ **- 0 pts** **Correct**

- 1 pts Incorrect implementation of rule

- 1 pts Incorrect final answer

gradescope

10)

a) -12 b) -15 c) 4 d) 3 e) -27

10) a) $\det(A)\cdot\det(B) = \det AB$

$-3 \cdot 4 = -12$

b) $\det(5A) = -3(5) = -15$

c) $\det B^T = \det B = 4$

d) $\det A^{-1} = (\det(A))^{-1} = 3$

e) $\det A^3 = (-3)^3 = -27$

11) ~~$a\cdot\begin{bmatrix} e & f \\ h & i \end{bmatrix} - b\begin{bmatrix} d & f \\ g & i \end{bmatrix} + c\begin{bmatrix} d & e \\ g & h \end{bmatrix}$~~ nope

~~$a(e\cdot i - h\cdot f) - b(d\cdot i - f\cdot g) + c(d\cdot h - g\cdot e) = 7$~~

1) if multiply column of A by a number, det will be mult by same.
2) if ith column in A is sum of ith column of B and ith column of C, $\det(A = \det(B) + \det(C)$
3) two columns of A are equal $\det(A) = 0$
4) if we add a scalar from one row to the another, det will not change
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6) $\det(A) = \det(A^T)$

a) $7\cdot 3 = 21$ b) $7\cdot 5 = 35$ c) 7

12a) $\begin{bmatrix} 3 & 4 & -3 & 1 \\ 3 & 0 & 1 & -3 \\ -6 & 0 & -4 & 3 \\ 6 & 8 & -4 & -1 \end{bmatrix}$ $4\cdot\begin{bmatrix} 3 & 1 & -3 \\ 6 & -4 & 3 \\ 6 & -4 & -1 \end{bmatrix} = \cancel{0} + 0 - 8\cdot\begin{bmatrix} 3 & -3 & 1 \\ 3 & 1 & -3 \\ -6 & -4 & 3 \end{bmatrix}$

$3\cdot\begin{bmatrix} -4 & 3 \\ -4 & -1 \end{bmatrix} - 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & -1 \end{bmatrix} + 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix}$ | $72 - 12 = \boxed{60}$

$3(\overset{4 - -12}{4 + 12}) - 6(-1+12) + 6(3+12) = 72$

$3(16) - 66 + 6(15)$

$3\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix} - 3\begin{bmatrix} -3 & 1 \\ -4 & 3 \end{bmatrix} + -6\begin{bmatrix} -3 & 1 \\ 1 & -3 \end{bmatrix}$

$3(3+12) - 3(-9+4) + -6(9-1) = (3\cdot 15) - (3(-5)) + -6(8) = 12$

10.2 **1 / 2**

- **0 pts** Correct

✓ - **1 pts** **Incorrect implementation of rule**

- **1 pts** Incorrect final answer

gradescope

10)

a) -12 b) -15 c) 4 d) 3 e) -27

10) a) $\det(A)\cdot\det(B) = \det AB$

$-3 \cdot 4 = -12$

b) $\det(5A) = -3(5) = -15$

c) $\det B^T = \det B = 4$

d) $\det A^{-1} = (\det(A))^{-1} = 3$

e) $\det A^3 = (-3)^3 = -27$

11) ~~$a\cdot\begin{bmatrix} e & f \\ h & i \end{bmatrix} - b\begin{bmatrix} d & f \\ g & i \end{bmatrix} + c\begin{bmatrix} d & e \\ g & h \end{bmatrix}$~~ nope

~~$a(e\cdot i - h\cdot f) - b(d\cdot i - f\cdot g) + c(d\cdot h - g\cdot e) = 7$~~

1) if multiply column of A by a number, det will be mult by same.
2) if ith column in A is sum of ith column of B and ith column of C, $\det(A = \det(B) + \det(C)$
3) two columns of A are equal $\det(A) = 0$
4) if we add a scalar from one row to the another, det will not change
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6) $\det(A) = \det(A^T)$

a) $7\cdot 3 = 21$ b) $7\cdot 5 = 35$ c) 7

12a) $\begin{bmatrix} 3 & 4 & -3 & 1 \\ 3 & 0 & 1 & -3 \\ -6 & 0 & -4 & 3 \\ 6 & 8 & -4 & -1 \end{bmatrix}$ $4\cdot\begin{bmatrix} 3 & 1 & -3 \\ 6 & -4 & 3 \\ 6 & -4 & -1 \end{bmatrix} = \cancel{0} + 0 - 8\cdot\begin{bmatrix} 3 & -3 & 1 \\ 3 & 1 & -3 \\ -6 & -4 & 3 \end{bmatrix}$

$3\cdot\begin{bmatrix} -4 & 3 \\ -4 & -1 \end{bmatrix} - 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & -1 \end{bmatrix} + 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix}$ | $72 - 12 = \boxed{60}$

$3(\overset{4 - -12}{4 + 12}) - 6(-1+12) + 6(3+12) = 72$

$3(16) - 66 + 6(15)$

$3\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix} - 3\begin{bmatrix} -3 & 1 \\ -4 & 3 \end{bmatrix} + -6\begin{bmatrix} -3 & 1 \\ 1 & -3 \end{bmatrix}$

$3(3+12) - 3(-9+4) + -6(9-1) = (3\cdot 15) - (3(-5)) + -6(8) = 12$

10.3 **2 / 2**

✓ **- 0 pts** **Correct**

- 1 pts Incorrect implementation of rule

- 1 pts Incorrect final answer

gradescope

10)

a) -12 b) -15 c) 4 d) 3 e) -27

10) a) $\det(A)\cdot\det(B) = \det AB$

$-3 \cdot 4 = -12$

b) $\det(5A) = -3(5) = -15$

c) $\det B^T = \det B = 4$

d) $\det A^{-1} = (\det(A))^{-1} = 3$

e) $\det A^3 = (-3)^3 = -27$

11) ~~$a\cdot\begin{bmatrix} e & f \\ h & i \end{bmatrix} - b\begin{bmatrix} d & f \\ g & i \end{bmatrix} + c\begin{bmatrix} d & e \\ g & h \end{bmatrix}$~~ nope

~~$a(e\cdot i - h\cdot f) - b(d\cdot i - f\cdot g) + c(d\cdot h - g\cdot e) = 7$~~

1) if multiply column of A by a number, det will be mult by same.
2) if ith column in A is sum of ith column of B and ith column of C, $\det(A = \det(B) + \det(C)$
3) two columns of A are equal $\det(A) = 0$
4) if we add a scalar from one row to the another, det will not change
5) Swapping two rows will change $\det(A)$'s sign
6) $\det(A) = \det(A^T)$

a) $7\cdot 3 = 21$ b) $7\cdot 5 = 35$ c) 7

12a) $\begin{bmatrix} 3 & 4 & -3 & 1 \\ 3 & 0 & 1 & -3 \\ -6 & 0 & -4 & 3 \\ 6 & 8 & -4 & -1 \end{bmatrix}$ $4\cdot\begin{bmatrix} 3 & 1 & -3 \\ 6 & -4 & 3 \\ 6 & -4 & -1 \end{bmatrix} = \cancel{0} + 0 - 8\cdot\begin{bmatrix} 3 & -3 & 1 \\ 3 & 1 & -3 \\ -6 & -4 & 3 \end{bmatrix}$

$3\cdot\begin{bmatrix} -4 & 3 \\ -4 & -1 \end{bmatrix} - 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & -1 \end{bmatrix} + 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix}$ | $72 - 12 = \boxed{60}$

$3(\overset{4 - -12}{4 + 12}) - 6(-1+12) + 6(3+12) = 72$

$3(16) - 66 + 6(15)$

$3\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix} - 3\begin{bmatrix} -3 & 1 \\ -4 & 3 \end{bmatrix} + -6\begin{bmatrix} -3 & 1 \\ 1 & -3 \end{bmatrix}$

$3(3+12) - 3(-9+4) + -6(9-1) = (3\cdot 15) - (3(-5)) + -6(8) = 12$

10.4 **0 / 2**

- **0 pts** Correct

✓ **- 1 pts** Incorrect implementation of rule

✓ **- 1 pts** Incorrect final answer

gradescope

10)

a) -12 b) -15 c) 4 d) 3 e) -27

10) a) $\det(A)\cdot\det(B) = \det AB$

$-3 \cdot 4 = -12$

b) $\det(5A) = -3(5) = -15$

c) $\det B^T = \det B = 4$

d) $\det A^{-1} = (\det(A))^{-1} = 3$

e) $\det A^3 = (-3)^3 = -27$

11) ~~$a\cdot\begin{bmatrix} e & f \\ h & i \end{bmatrix} - b\begin{bmatrix} d & f \\ g & i \end{bmatrix} + c\begin{bmatrix} d & e \\ g & h \end{bmatrix}$~~ nope

~~$a(e\cdot i - h\cdot f) - b(d\cdot i - f\cdot g) + c(d\cdot h - g\cdot e) = 7$~~

1) if multiply column of A by a number, det will be mult by same.
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$3\cdot\begin{bmatrix} -4 & 3 \\ -4 & -1 \end{bmatrix} - 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & -1 \end{bmatrix} + 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix}$ | $72 - 12 = \boxed{60}$

$3(\overset{4 - -12}{4 + 12}) - 6(-1+12) + 6(3+12) = 72$

$3(16) - 66 + 6(15)$

$3\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix} - 3\begin{bmatrix} -3 & 1 \\ -4 & 3 \end{bmatrix} + -6\begin{bmatrix} -3 & 1 \\ 1 & -3 \end{bmatrix}$

$3(3+12) - 3(-9+4) + -6(9-1) = (3\cdot 15) - (3(-5)) + -6(8) = 12$

10.5 **2 / 2**

✓ **- 0 pts** **Correct**

- 1 pts Incorrect implementation of rule

- 1 pts Incorrect final answer

gradescope

10)

a) -12 b) -15 c) 4 d) 3 e) -27

10) a) $\det(A)\cdot\det(B) = \det AB$

$-3 \cdot 4 = -12$

b) $\det(5A) = -3(5) = -15$

c) $\det B^T = \det B = 4$

d) $\det A^{-1} = (\det(A))^{-1} = 3$

e) $\det A^3 = (-3)^3 = -27$

11) ~~$a\cdot\begin{bmatrix} e & f \\ h & i \end{bmatrix} - b\begin{bmatrix} d & f \\ g & i \end{bmatrix} + c\begin{bmatrix} d & e \\ g & h \end{bmatrix}$~~ nope

~~$a(e\cdot i - h\cdot f) - b(d\cdot i - f\cdot g) + c(d\cdot h - g\cdot e) = 7$~~

1) if multiply column of A by a number, det will be mult by same.
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$3\cdot\begin{bmatrix} -4 & 3 \\ -4 & -1 \end{bmatrix} - 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & -1 \end{bmatrix} + 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix}$ | $72 - 12 = \boxed{60}$

$3(\overset{4 - -12}{4 + 12}) - 6(-1+12) + 6(3+12) = 72$

$3(16) - 66 + 6(15)$

$3\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix} - 3\begin{bmatrix} -3 & 1 \\ -4 & 3 \end{bmatrix} + -6\begin{bmatrix} -3 & 1 \\ 1 & -3 \end{bmatrix}$

$3(3+12) - 3(-9+4) + -6(9-1) = (3\cdot 15) - (3(-5)) + -6(8) = 12$

11.1 3 / 3

✓ **- 0 pts** Correct

- 2 pts Incorrect implementation of rule

- 1 pts Incorrect final answer

gradescope

10)

a) -12 b) -15 c) 4 d) 3 e) -27

10) a) $\det(A)\cdot\det(B) = \det AB$

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c) $\det B^T = \det B = 4$

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e) $\det A^3 = (-3)^3 = -27$

11) ~~$a\cdot\begin{bmatrix} e & f \\ h & i \end{bmatrix} - b\begin{bmatrix} d & f \\ g & i \end{bmatrix} + c\begin{bmatrix} d & e \\ g & h \end{bmatrix}$~~ nope

~~$a(e\cdot i - h\cdot f) - b(d\cdot i - f\cdot g) + c(d\cdot h - g\cdot e) = 7$~~

1) if multiply column of A by a number, det will be mult by same.
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$3\cdot\begin{bmatrix} -4 & 3 \\ -4 & -1 \end{bmatrix} - 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & -1 \end{bmatrix} + 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix}$ | $72 - 12 = \boxed{60}$

$3(\overset{4 - -12}{4 + 12}) - 6(-1+12) + 6(3+12) = 72$

$3(16) - 66 + 6(15)$

$3\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix} - 3\begin{bmatrix} -3 & 1 \\ -4 & 3 \end{bmatrix} + -6\begin{bmatrix} -3 & 1 \\ 1 & -3 \end{bmatrix}$

$3(3+12) - 3(-9+4) + -6(9-1) = (3\cdot 15) - (3(-5)) + -6(8) = 12$

11.2 3 / 3

✓ **- 0 pts** Correct

- 2 pts Incorrect implementation of rule

- 1 pts Incorrect final answer

gradescope

10)

a) -12 b) -15 c) 4 d) 3 e) -27

10) a) $\det(A)\cdot\det(B) = \det AB$

$-3 \cdot 4 = -12$

b) $\det(5A) = -3(5) = -15$

c) $\det B^T = \det B = 4$

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11) ~~$a\cdot\begin{bmatrix} e & f \\ h & i \end{bmatrix} - b\begin{bmatrix} d & f \\ g & i \end{bmatrix} + c\begin{bmatrix} d & e \\ g & h \end{bmatrix}$~~ nope

~~$a(e\cdot i - h\cdot f) - b(d\cdot i - f\cdot g) + c(d\cdot h - g\cdot e) = 7$~~

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$3\cdot\begin{bmatrix} -4 & 3 \\ -4 & -1 \end{bmatrix} - 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & -1 \end{bmatrix} + 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix}$ | $72 - 12 = \boxed{60}$

$3(\overset{4 - -12}{4 + 12}) - 6(-1+12) + 6(3+12) = 72$

$3(16) - 66 + 6(15)$

$3\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix} - 3\begin{bmatrix} -3 & 1 \\ -4 & 3 \end{bmatrix} + -6\begin{bmatrix} -3 & 1 \\ 1 & -3 \end{bmatrix}$

$3(3+12) - 3(-9+4) + -6(9-1) = (3\cdot 15) - (3(-5)) + -6(8) = 12$

11.3 3 / 3

✓ **- 0 pts** Correct

- 2 pts Incorrect implementation of rule

- 1 pts Incorrect final answer

gradescope

10)

a) -12 b) -15 c) 4 d) 3 e) -27

10) a) $\det(A)\cdot\det(B) = \det AB$

$-3 \cdot 4 = -12$

b) $\det(5A) = -3(5) = -15$

c) $\det B^T = \det B = 4$

d) $\det A^{-1} = (\det(A))^{-1} = 3$

e) $\det A^3 = (-3)^3 = -27$

11) ~~$a\cdot\begin{bmatrix} e & f \\ h & i \end{bmatrix} - b\begin{bmatrix} d & f \\ g & i \end{bmatrix} + c\begin{bmatrix} d & e \\ g & h \end{bmatrix}$~~ nope

~~$a(e\cdot i - h\cdot f) - b(d\cdot i - f\cdot g) + c(d\cdot h - g\cdot e) = 7$~~

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$3\cdot\begin{bmatrix} -4 & 3 \\ -4 & -1 \end{bmatrix} - 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & -1 \end{bmatrix} + 6\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix}$ | $72 - 12 = \boxed{60}$

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$3\cdot\begin{bmatrix} 1 & -3 \\ -4 & 3 \end{bmatrix} - 3\begin{bmatrix} -3 & 1 \\ -4 & 3 \end{bmatrix} + -6\begin{bmatrix} -3 & 1 \\ 1 & -3 \end{bmatrix}$

$3(3+12) - 3(-9+4) + -6(9-1) = (3\cdot 15) - (3(-5)) + -6(8) = 12$

12.1 3 / 3

✓ **- 0 pts** Correct

- 3 pts Incorrect / No answer

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126) $\begin{bmatrix} -1 & 2 & 3 & 0 \\ 3 & 4 & 3 & 0 \\ 11 & 4 & 6 & 6 \\ 4 & 2 & 4 & 3 \end{bmatrix}$ $\cancel{0-0}+6\begin{bmatrix} -1 & 2 & 3 \\ 3 & 4 & 3 \\ 4 & 2 & 4 \end{bmatrix} - 3\begin{bmatrix} -1 & 2 & 3 \\ 3 & 4 & 3 \\ 11 & 4 & 6 \end{bmatrix}$

$6\left(2\begin{bmatrix} 3 & 3 \\ 4 & 4 \end{bmatrix} - 4\cdot\begin{bmatrix} -1 & 3 \\ 4 & 4 \end{bmatrix} + 2\cdot\begin{bmatrix} -1 & 3 \\ 3 & 3 \end{bmatrix}\right) -$

$3\left(2\cdot\begin{bmatrix} 3 & 3 \\ 11 & 6 \end{bmatrix} - 4\cdot\begin{bmatrix} -1 & 3 \\ 11 & 6 \end{bmatrix} + 4\cdot\begin{bmatrix} -1 & 3 \\ 3 & 3 \end{bmatrix}\right)$

$6(\cancel{(2(12-12)} - 4(-4-12) + 2(-3-9)) =$

$6(-4(-16) + 2(-12)) = 40\cdot 6 = 240$

$3((2(18-33)) - 4(-6-33) + 4(-3-9))$

$3(2(-15) - 4(-39) + 4(-12)) = 234$

$240-234=6$

12.2 3 / 3

✓ **- 0 pts** Correct

- 3 pts Incorrect / No answer

gradescope

13)

$$\begin{array}{c} \\ 50 \end{array} \begin{array}{c} A \leq 0 \\ \begin{bmatrix} 20 & & 30 \\ 20 & A_{11} & 20 & A_{12} \\ & 20 & & 30 \\ 30 & A_{21} & 30 & A_{22} \end{bmatrix} \end{array} \begin{bmatrix} 20 & X_{11} \\ 30 & X_{12} \end{bmatrix} \quad \begin{array}{c} \cancel{X_{11}} \\ \cancel{X_{12}} \end{array} \quad \begin{array}{c} B_{11} \\ B_{12} \end{array}$$

$$\begin{bmatrix} A_{11} \\ A_{21} \end{bmatrix} X_{11} + \begin{bmatrix} A_{12} \\ A_{22} \end{bmatrix} X_{12} = \begin{bmatrix} B_{11} \\ B_{12} \end{bmatrix}$$

$$\cancel{A_{11} X_1 + A_{12} X_2 = b_{11}}$$

$$\cancel{A_{21} X_1 + A_{22} X_2 = b_2}$$

$$\begin{bmatrix} A_{11} & 0 \\ A_{21} & A_{22} \end{bmatrix} = A \qquad Ax = b$$

$$\begin{bmatrix} A_{11} & 0 \\ A_{21} & A_{22} \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \end{bmatrix}$$

$$A_{11} X_1 = b_1$$

$$A_{21} X_1 + A_{22} X_2 = b_2$$

$$A_{22} X_2 = b_2 - A_{21} X_1$$

$$A_{22} X_2 = k \qquad b_2 - A_{21} X_1 = k$$

$[A_{22} k]$ = echelon form with row reductions for X_2.

13 **5 / 5**

✓ **- 0 pts** Correct

- 2.5 pts Incorrect

- 5 pts Incorrect

- 1 pts Pages Not Selected

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ommand Window

findInverseOf2x2Matrix.m | findCrossProduct.m | findDeterminant.m

Editor - findCrossProduct.m

```
%x is the input matrix.
function ret = findCrossProduct(x)
A=zeros(3,1);
A(1)= x(2,1) * x(3,2) - x(3,1)*x(2,2)i;
A(2)= x(1,1) * x(3,2) - x(3,1) * x(1,2)j;
A(3)= x(1,1) * x(2,2) - x(2,1) * x(1,2)k;
%ret is the variable that will contain the cross product of the first two columns of x
end
```

ASUS

14 **10 / 10**

✓ **- 0 pts** **Correct**

- 10 pts No answer

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