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| By Cliff Rodriguez |
| Matrix Algebra |
| Date: Due August 13, 2018 |

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Contents

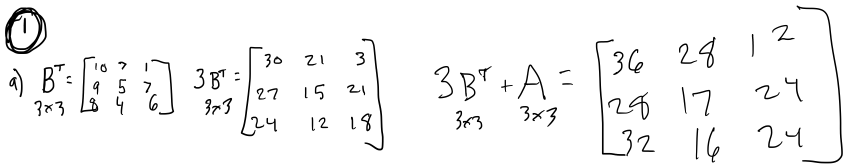
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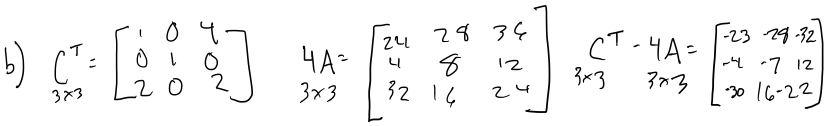
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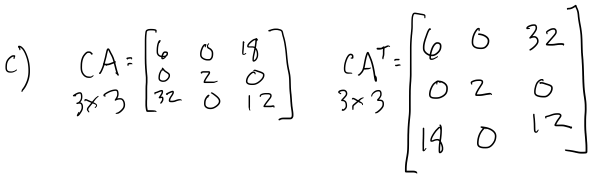
# Question 1

Each question will be demonstrated using handwritten math as well as MatLab scripts.

## Handmath







## MatLab

% Problem 1

clear;

A = [6 7 9;

1 2 3;

8 4 6];

B = [10 9 8;

7 5 4;

1 7 6];

C = [1 0 2;

0 1 0;

4 0 2;];

Bt = transpose(B);

Ct = transpose(C);

diary on;

diary('');

%Print Problem 1 Solutions

disp('Problem 1');

% questions a

asolution = [3\*Bt + A];

disp('Question a');

display(asolution);

% question b

bsolution = Ct - 4\*A;

disp('Question b');

display(bsolution);

% question c

csolution = transpose(C\*A);

disp('Question c');

display(csolution);

diary off;

## Console Output

Problem 1

Question a

asolution =

36 28 12

28 17 24

32 16 24

Question b

bsolution =

-23 -28 -32

-4 -7 -12

-30 -16 -22

Question c

csolution =

22 1 40

15 2 36

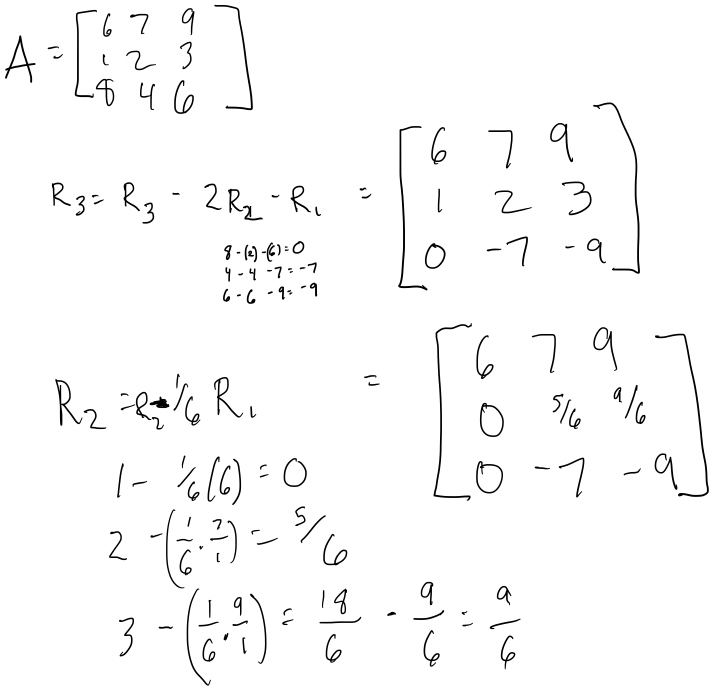
21 3 48

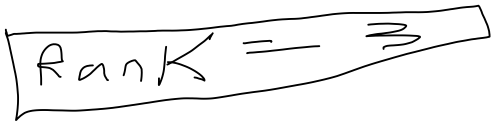
# Question 2

**Show the rank of each matrix.**

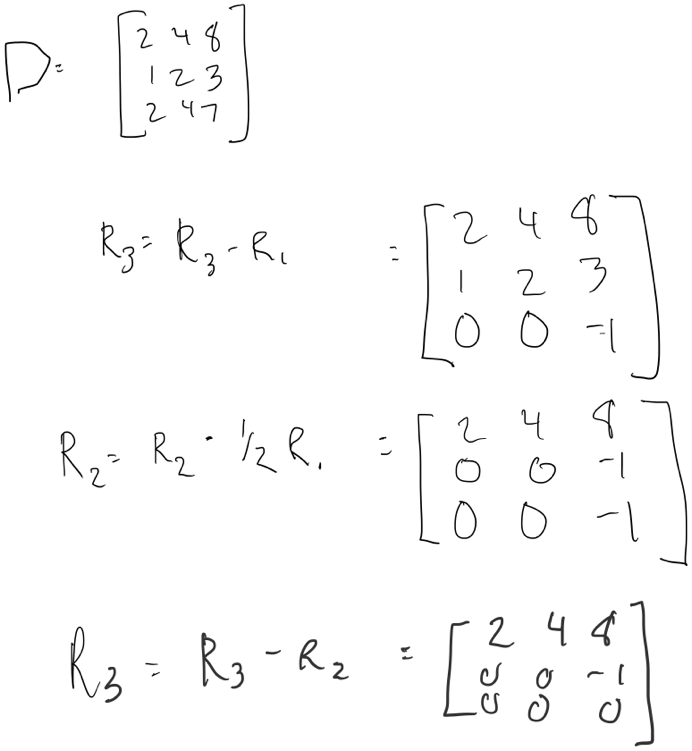


## Handmath



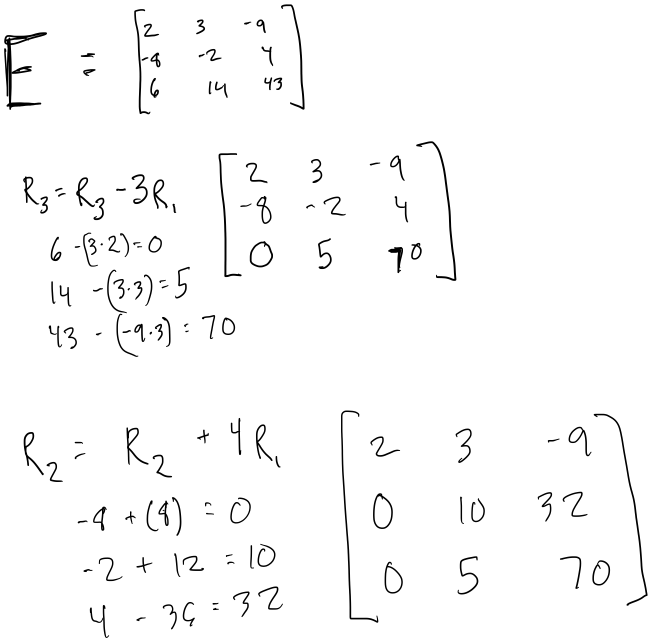


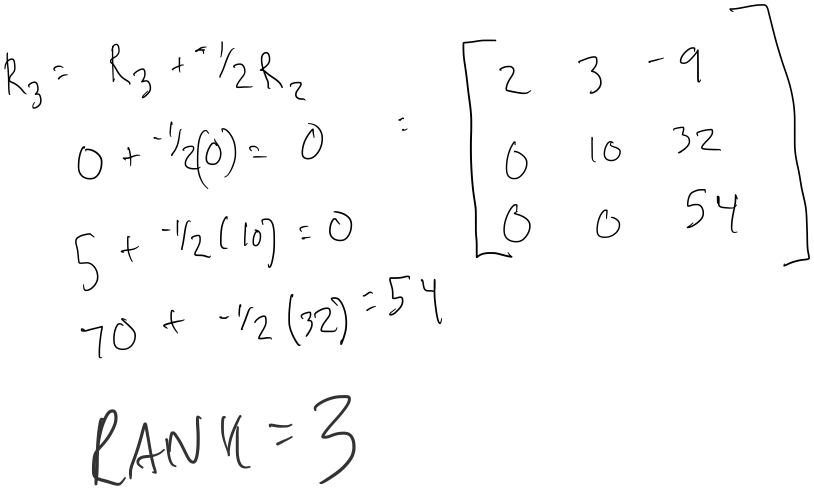
b.





c.





## MatLab

## 

% Problem 2

% question a

disp('Matrix A');

disp(A);

disp('Rank Matrix A = ');

display(rank(A));

% question b

D = [2 4 8;

1 2 3;

2 4 7];

disp('Matrix D =');

disp(D);

disp('Rank Matrix D = ');

display(rank(D));

% question c

E = [2 3 -9;

-8 -2 4;

6 14 43];

disp('Matrix E =');

disp(E);

disp('Rank Matrix E =');

display(rank(E));

diary off;

## Console Output

Matrix A

6 7 9

1 2 3

8 4 6

Rank Matrix A =

3

Matrix D =

2 4 8

1 2 3

2 4 7

Rank Matrix D =

2

Matrix E =

2 3 -9

-8 -2 4

6 14 43

Rank Matrix E =

3

# Question 3

A is not invertable.

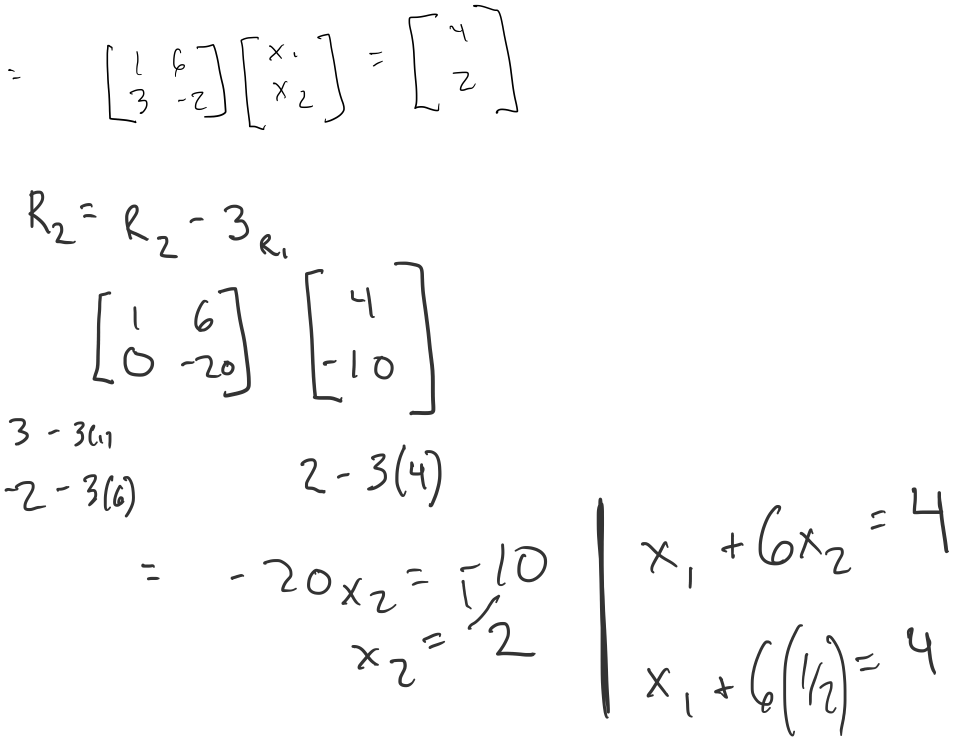
B inverse is a.

Inverse of C is b.

# Question 4

2

## Handmath





## MatLab

% Author: Cliff Rodriguez

% Linear Algebra Problem 4a

% Demonstrates ToMatrix

% Problem 4

% question a

clear All;

syms x y

eqn1 = 2\*x+6\*y == 4;

eqn2 = 3\*x - 2\*y == 2;

[A,B] = equationsToMatrix([eqn1, eqn2], [x, y]);

X = linsolve(A,B);

disp('coefficient matrix');

disp(A);

disp('equals matrix');

disp(B);

disp('solutions:')

disp(X);

## Console Output

>> HW2\_Problem4a

coefficient matrix

[ 1, 6]

[ 3, -2]

equals matrix

4

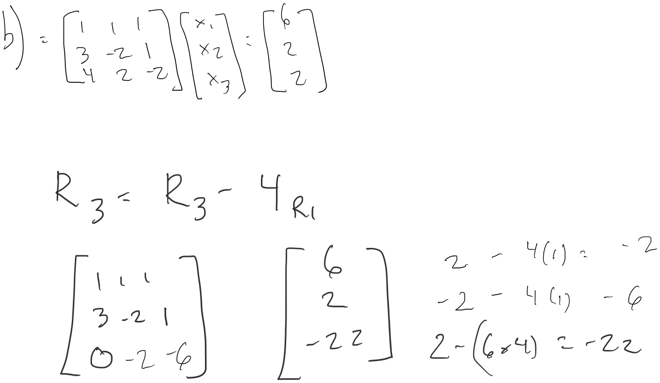
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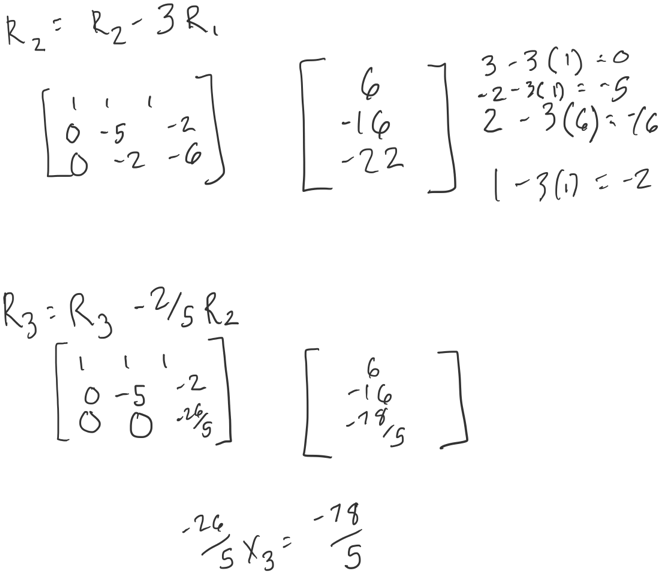
solutions:

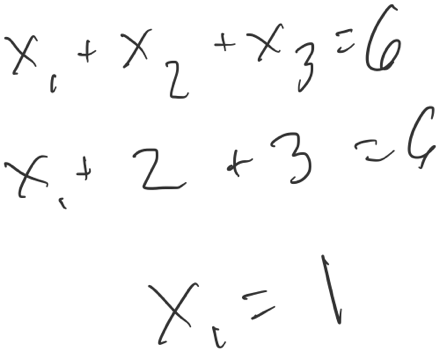
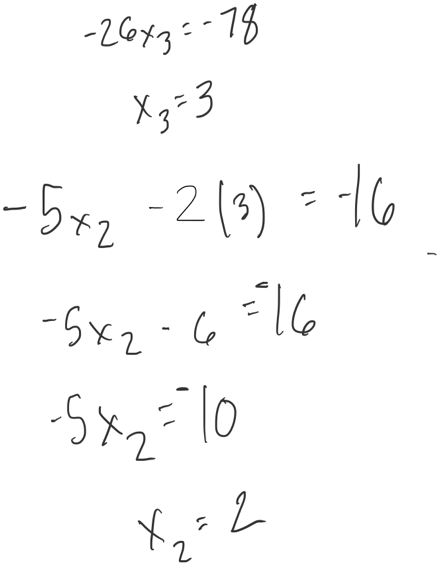
1

1/2

## Handmath







## MatLab

% Author: Cliff Rodriguez

% Linear Algebra Problem 4b

% Demonstrates Solving a set of equations using solve

% Problem 4

% question b

clear All;

syms x y z

eqn1 = 1\*x + 1\*y + 1\*z == 6;

eqn2 = 3\*x - 2\*y + 3\*z == 2;

eqn3 = 4\*x + 2\*y - 2\*z== 2;

sol = solve([eqn1, eqn2 eqn3], [x, y, z]);

xSol = sol.x;

ySol = sol.y;

zSol = sol.z;

disp('x =');

disp(xSol);

disp('y =');

disp(ySol);

disp('z =');

disp(zSol);

## Console Output

>> HW2\_Problem4b

>> HW2\_Problem4b

x =

1

y =

2

z =

3