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Question 1

```
A = [1 2 -3; 2 5 -8; 3 8 -13]; % Setting values of A matrix
B = [1; 4; 7]; % Setting values of B matrix
augAB = [A, B] % Forming augmented matrix AB
```

```
augAB =
```

```
1    2    -3    1
2    5    -8    4
3    8   -13    7
```

Question 2

```
r = rref(augAB) % Finding reduced row echelon form
```

```
r =
```

```
1    0    1   -3
0    1   -2    2
0    0    0    0
```

Question 3

```
%{
pivots: (1, 1), (2, 2)
basic variables: X1, X2
free variables: X3
%}
```

Question 4

```
%{
```

```
X1 = -3 - X3
X2 = 2 + 2X3
X3 = free
%}
```

Question 5

```
X3 = 1; % Setting value of X3
X1 = -3 - X3; % Defining X1 as a function of X3
X2 = 2 + 2*X3; % Defining X2 as a function of X3
sol_vec1 = [X1; X2; X3]; % Defining solution vector
check1 = A * sol_vec1; % Check vector of solved the system
equal1 = isequal(B, check1) % Returns true if the solutions work
```

```
X3 = 2; % Setting a different value of X3 to show free variable
X1 = -3 - X3; % Same as above
X2 = 2 + 2*X3;
sol_vec2 = [X1; X2; X3];
check2 = A * sol_vec2;
equal2 = isequal(B, check2) % Same as above
```

```
equal1 =
```

```
1
```

```
equal2 =
```

```
1
```

Question 6

```
M = augAB % Setting up augmented matrix
M(2,:) = M(2,:) - 2*M(1,:) % Row2 - 2x Row1
M(3,:) = M(3,:) - 3*M(1,:) % Row3 - 3x Row1
M(3,:) = M(3,:) - 2*M(2,:) % Showing Row3 is a free variable
M(1,:) = M(1,:) - 2*M(2,:) % Row1 - 2x Row2
equal3 = isequal(r, M) % Returns true if code function rref()
% and manually done are equivalent
```

```
M =
```

```
1      2      -3      1
2      5      -8      4
3      8     -13      7
```

```
M =
```

```
1      2      -3      1
```

0	1	-2	2
3	8	-13	7

 $M =$

1	2	-3	1
0	1	-2	2
0	2	-4	4

 $M =$

1	2	-3	1
0	1	-2	2
0	0	0	0

 $M =$

1	0	1	-3
0	1	-2	2
0	0	0	0

 $equal3 =$

1

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