MAU11S02 Group A1 Quiz 03 9am 13/2/19 ANSWERS

Rules and procedures.
1. Answers must be handed up at the end of the tutorial, no other time. **2.** Attempt 3 questions. Only *your first three answers* will be marked. **3.** Each question carries 20 marks, so the maximum quiz mark is 60. **4.** Marked quizzes will be returned, and answers published, the following week. **5.** If a particular method of solution is stipulated, you get no marks if you don't use it. **6.** The (9) quizzes will contribute 20% to your overall mark. **7.** You are allowed to collaborate and compare answers during the tutorial.

Answer 1.

```
      3          1          4
      1          5          9
      2          6          5

      3          1          4
      0          14/3       23/3
      0          16/3        7/3

      3          1          4
      0          14/3       23/3
      0          0         -45/7
Final determinant is -90.  No swaps. Original determinant -90.
```

Answer 2.

```
(2,1) minor $0$, (2,2) minor 4
```

Answer 3.

```
(2,3) minor -6, (2,4) minor -2.

(-3)(0) + (-1)(4) - (4)(-6) + (9)(-2) = 2
```

Answer 4.

```
 1          0          1          3
 3         -1          4          9
-2          0         -4        -12
 0         -1         -4        -14

 1          0          1          3
 0         -1          1          0
 0          0         -2         -6
 0         -1         -4        -14

 1          0          1          3
 0         -1          1          0
 0          0         -2         -6
 0          0         -5        -14

 1          0          1          3
 0         -1          1          0
 0          0         -2         -6
 0          0          0          1    upper T form
```

```
Final determinant 2, no swaps: original determinant 2.
```

Answer 5. Run GJE on the column vectors.

```
 2      3      4      8  *(1/2)  =R1
 6      4      7      1   -6*R1
 4      1      8      4   -4*R1

 1    3/2      2      4   -3/2*R2
 0     -5     -5    -23  *(-1/5)  =R2
 0     -5      0    -12   +5*R2

 1      0    1/2 -29/10   -1/2*R3
 0      1      1   23/5   -1*R3
 0      0      5     11  *(1/5)  =R3

 1      0      0     -4
 0      1      0   12/5
 0      0      1   11/5  in rref
```

This shows (i) that the first 3 column vectors are linearly independent, and that the fourth (necessarily) depends on them.