Forget the Ones - Examples

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Solve by elimination

2x + 4y = -1

3x +3y = 1

If we want to eliminate x: If we want to eliminate y:

3(2x + 4y = -1) 3(2x + 4y = -1)

-2(3x + 3y = 1) -4(3x + 3y = 1)

6x + 12y = -3 6x + 12y = -3

-6x - 6y = -2 -12x -12y = -4

 6y = -5 -6x = -7

 y = -5/6 x = 7/6

Then use back substitution to find the remaining variable.

Only Show Nice Examples Approach



 Everything works out nicely with no fractions!

Source: http://www.math.dartmouth.edu/archive/m23s06/public\_html/handouts/row\_reduction\_examples.pdf

Fractions Approach

Step 1: Multiply Row 1 by 1/2:

Step 2: Replace R2 with -3R1 + R2:

-3R1 -3 -6 3/2

 +R2 3 3 1

0 -3 5/2

Step 3: Multiply Row 2 by -1/3:

Step 4: Replace R1 with R1 + -2R2:

R1 1 2 -1/2

-2R2 0 -2 10/6

1 0 7/6

Linear Combination Approach

Find a linear combination of 2 and 3 that equals 1.

Replace R1 with -R1 + R2.

-R1 -2 -4 1

 +R2 3 3 1

1 -1 2

Step 2: Replace R2 with -3R1 + R2

-3R1 -3 3 -6

 +R2 3 3 1

 0 6 -5

Find a linear combination of -1 and 6 that equals 1.

Step 3: Replace R2 with 5R1 + R2

5R1 5 -5 10

 +R2 0 6 -5

 5 1 5

But now we’ve lost the 0 we had in column 1 before, so the linear combination approach did not work here. We need a different approach for Step 3.

Step 3 Alternative Option 1: If our linear combination for Step 3 did not work, switch to fraction method and multiply R2 by 1/6

Then continue as in the fractions method.

Step 3 Alternative Option 2: If we cannot come up with a linear combination for Step 3, use whatever number is there to turn the number in Row 1 Column 2 into 0. Replace R1 with 6R1 + R2:

6R1 6 -6 12

 +R2 0 6 -5

 6 0 7

But now we have lost the 1 we had in the first column! Is that okay, or is it not okay? Why did we do a step to get a one there if we’re just going to undo it?

“Forget the Ones” Method:

Step 1: Replace R2 with -3R1 + 2R2.

-3R1 -6 -12 3

 2R2 6 6 2

 0 -6 5

Step 2: Replace R1 with 3R1 + 2R2:

3R1 6 12 -3

 2R2 0 -12 10

 6 0 7

Step 3: Multiply R1 by 1/6 and R2 by -1/6: