**Checklist**

- **Important:** Read Each Question Carefully - dont rush into doing things you are not asked to do
- Picking Pivot Column (most negative value in indicator row a.k.a. the top row)
- Picking Pivot Row
  * Divide the "Barrier" column by pivot column for each corresponding entry
  * *(focus on positive values entries only.)*
  * Choose the smallest positive result
- Picking Pivot Point (Intersection of Pivot Row and Pivot Column)

**Checklist - Continued**

- ► Performing Elementary Row Operations
  - ∗ Turn Pivot Point into a value of 1
  - ∗ Make other values in Pivot Column 0
- ► **Important:** Recognize when iteration process is complete
- ► **Important:** Recognize when iteration process isn't complete - particularly important when new constraints are added .

**Checklist - Continued**

- ▶ Recognize when optimal feasible solution has been found
- ▶ Recognize infeasibility
- ▶ State the solution of Tableau(i.e. for LP relaxation)
- ▶ (Recognize which variables necessarily have a value of zero).
- ▶ LP Relaxation.
- ▶ Recognize that LP optimality does not equate to IP optimality.
- ▶ Adding bounds (based on LP optimal solution) . Be able to state what these new constraints are.

**Addition of Constraints to Simplex Tableau**

- ▶ Important: Construction of New Constraints further to branch and bound.
- ▶ This will involve adding new rows and columns to the tableau.
- ▶ Remark: Exam 2012 Q1 Part D is very useful to practice with in this regard.
- ▶ See slides for **exceedance constraints** (i.e. $x_i \geq k$)

**Dual Simplex Method**
**(In General : Tranpose/Reverse of Simplex Method)**

- Pick most negative value from LHS column (i.e. the barrier column)
- We pick the associated row
- In the example below - we'd pick the last row, the row for -3.

| 25 | . . . | . . . | . . . | . . . | . . . |
|----|-------|-------|-------|-------|-------|
| 15 | . . . | . . . | . . . | . . . | . . . |
| 4  | . . . | . . . | . . . | . . . | . . . |
| **-3** | . . . | . . . | . . . | . . . | . . . |

**Dual Simplex Method**

- We are mainly interested in negative values on this row. Concentrate only on them.

| 25 | . . . | . . . | . . . | . . . | . . . |
|----|-------|-------|-------|-------|-------|
| 15 | . . . | . . . | . . . | . . . | . . . |
| 4  | . . . | . . . | . . . | . . . | . . . |
| **-3** | . . . | -5 | . . . | -2 | . . . |

### Dual Simplex Method

▶ Compare this values to the values in the top row. Compute the ratios.

| 25 | ... | 10 | ... | 8 | ... |
|-----|-----|-----|-----|-----|-----|
| 15 | ... | ... | ... | ... | ... |
| 4 | ... | ... | ... | ... | ... |
| **-3** | ... | -5 | ... | -2 | ... |

∗ Ratio: 10 /-5 = -2

∗ Ratio: 8 /-2 = -4

▶ Dont Expect any positive values here.

▶ Choose highest value (i.e closest to 0)