

In [4]:

```
from sympy import *
init_printing(use_unicode=True)

# Problem 8
A=Matrix([[1, 2, 3, 4, 5], [1, 2, 3, 4, 5], [1, 2, 3, 4, 5], [1, 2, 3, 4, 5], [1, 2, 3, 4, 5]])
print(A**3)

Matrix([[225, 450, 675, 900, 1125], [225, 450, 675, 900, 1125], [225, 450, 675, 900, 1125], [225, 450, 675, 900, 1125], [225, 450, 675, 900, 1125]])
```

In [5]:

```
# Problem 9
A=Matrix([[2, 4, 5], [2, 6, 1], [-2, 9, 15], [12, 0, 15], [3, 34, -52]])
B=Matrix([[2, 4, 5, 4], [2, 6, 1, 4], [-2, 9, 15, 4]])
C=A*B
D=C.T
print(D)

Matrix([[2, 14, -16, -6, 178], [77, 53, 181, 183, -252], [89, 31, 224, 285, -731], [44, 36, 88, 108, -60]])
```

In [7]:

```
import numpy as np
from numpy.linalg import matrix_rank

# Problem 10
M=np.matrix([[2, 4, 5], [2, 6, 1], [-2, 9, 15], [12, 0, 15], [3, 34, -52]])
print(matrix_rank(M))
```

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In [10]:

```
from sympy import *

# Problem 11
M=Matrix([[1, 0, 1, 3], [2, 3, 4, 7], [-1, -3, -3, -4]])
print(M.rref())
```

```
(Matrix([
[1, 0, 1, 3],
[0, 1, 2/3, 1/3],
[0, 0, 0, 0]]), [0, 1])
```