

## Filling a Matrix via a Rule

There are times when the elements of a matrix are computed from the values of the subscripts. For example, let us fill in the values for a 4x3 matrix called B where the value of element  $B_{i,j}=5i-3j$ . Our empty matrix would appear as


where we have sketched in boxes to indicate where we need to place the elements of the matrix. Then we can fill in the matrix by evaluating  $B_{i,j}=5i-3j$  for the various values of i and j representing the rows and columns, respectively. Thus,

$$B_{1,1} = 5*1-3*1 = 5-3 = 2.$$

$$B_{2,1} = 5*2-3*1 = 10-3 = 7.$$

$B_{1,2} = 5*1-3*2 = 5-6 = -1$ . We do not need to continue in order. We can just jump around if it suits us. For example:

$$B_{3,2} = 5*3-3*2 = 15-6 = 9.$$

$$B_{4,1} = 5*4-3*1 = 20-3 = 17.$$

$$B_{2,3} = 5*2-3*3 = 10-9 = 1.$$

We fill in the rest of the matrix to get:

<b>2</b>	<b>-1</b>	<b>-4</b>
<b>7</b>	<b>4</b>	<b>1</b>
<b>12</b>	<b>9</b>	<b>6</b>
<b>17</b>	<b>14</b>	<b>11</b>