**Sheet 1**

The Convolution Operation

In each of the following examples, convolve the two matrices and write the output:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1 | 1 | 2 | 0 | 3 |
| 2 | 3 | 0 | 5 | 1 |
| 2 | 3 | 0 | 4 | 4 |
| 2 | 2 | 1 | 1 | 2 |
| 1 | 0 | 0 | 0 | 3 |

|  |  |  |
| --- | --- | --- |
| 1 | 0 | -1 |
| 1 | 0 | -1 |
| 1 | 0 | -1 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| -4 | 0 | -1 | -2 | 5 |
| -7 | 3 | -2 | -6 | 9 |
| -6 | 5 | -2 | -6 | 10 |
| -5 | 4 | 0 | -8 | 5 |
| -2 | 2 | 1 | -4 | 1 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 250 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1/25 | 1/25 | 1/25 | 1/25 | 1/25 |
| 1/25 | 1/25 | 1/25 | 1/25 | 1/25 |
| 1/25 | 1/25 | 1/25 | 1/25 | 1/25 |
| 1/25 | 1/25 | 1/25 | 1/25 | 1/25 |
| 1/25 | 1/25 | 1/25 | 1/25 | 1/25 |