1.

```
2A = 2 * Matrix A
= 2 * [
1 2 -3
-5 4 2
]
= [
2 4 -6
-10 8 4
]
```

```
5B = 5 * Matrix B
= 5 * [
-2 6 4
-1 -2 3
]
= [
-10 30 20
-5 -10 15
]
```

```
2A + 5B = [
2 4 -6
-10 8 4
] + [
-10 30 20
-5 -10 15
]
= [
(2 + -10) (4 + 30) (-6 + 20)
(-10 + -5) (8 + -10) (4 + 15)
]
= [
-8 34 14
-15 -2 19
]
```

Therefore, 2A + 5B is equal to the matrix:

```
[
-8 34 14
-15 -2 19
]
```

2.

```
3A = 3 * Matrix A
= 3 * [
-3 1
-2 4
5 -1
]
= [
-9 3
-6 12
15 -3
]
```

```
2B = 2 * Matrix B
= 2 * [
4 -2
0 -2
-2 4
]
= [
8 -4
0 -4
-4 8
]
```

```
3A - 2B = [
-9 3
-6 12
15 -3
] - [
8 -4
0 -4
-4 8
]
= [
(-9 - 8) (3 - -4)
(-6 - 0) (12 - -4)
(15 - -4) (-3 - 8)
]
= [
-17 7
-6 16
19 -11
]
```

Therefore, 3A – 2B is equal to the matrix:

```
[
-17 7
-6 16
19 -11
]
```

3.

```
Matrix A = [
3 -2 5
0 -1 6
-4 2 -1
]
```

```
Matrix B = [
2 -1 0
3 -5 2
1 4 -2
]
```

```
BA = [
(2 * 3 + -1 * 0 + 0 * -4) (2 * -2 + -1 * -1 + 0 * 2) (2 * 5 + -1 * 6 + 0 * -1)
(3 * 3 + -5 * 0 + 2 * -4) (3 * -2 + -5 * -1 + 2 * 2) (3 * 5 + -5 * 6 + 2 * -1)
(1 * 3 + 4 * 0 + -2 * -4) (1 * -2 + 4 * -1 + -2 * 2) (1 * 5 + 4 * 6 + -2 * -1)
]
```

Therefore, BA is equal to the matrix:

```
BA = [
6 3 7
1 3 -19
17 -6 29
]
```

4.

```
Matrix A = [
1 -2
4 -3
]
```

```
Matrix B = [
-1 4
6 -2
]
```

```
First, let's calculate the transpose of Matrix A:

AT = Transpose of Matrix A
= [
1 4
-2 -3
]

Now, let's calculate the transpose of Matrix B:

BT = Transpose of Matrix B
= [
-1 6
4 -2
]
```

```
3AT - 2BT = 3 * AT - 2 * BT
= 3 * [
1 4
-2 -3
] - 2 * [
-1 6
4 -2
]
= [
3 12
-6 -9
] - [
-2 12
8 -4
]
= [
(3 - -2) (12 - 12)
(-6 - 8) (-9 - -4)
]
= [
5 0
-14 -5
]
```

Therefore, 3AT – 2BT is equal to the matrix:

```
[
5 0
-14 -5
]
```