```
> with(linalg):
> A1:=Matrix([[1,-3,2,6],
              [1,4,-1,4],
              [5,6,1,20]]);
```

$$A1 := \begin{bmatrix} 1 & -3 & 2 & 6 \\ 1 & 4 & -1 & 4 \\ 5 & 6 & 1 & 20 \end{bmatrix} \quad (1)$$

```
> A2:=addrow(A1,1,2,-1);
```

$$A2 := \begin{bmatrix} 1 & -3 & 2 & 6 \\ 0 & 7 & -3 & -2 \\ 5 & 6 & 1 & 20 \end{bmatrix} \quad (2)$$

```
> A3:=addrow(A2,1,3,-5);
```

$$A3 := \begin{bmatrix} 1 & -3 & 2 & 6 \\ 0 & 7 & -3 & -2 \\ 0 & 21 & -9 & -10 \end{bmatrix} \quad (3)$$

```
> A4:=mulrow(A3,2,1/7);
```

$$A4 := \begin{bmatrix} 1 & -3 & 2 & 6 \\ 0 & 1 & -\frac{3}{7} & -\frac{2}{7} \\ 0 & 21 & -9 & -10 \end{bmatrix} \quad (4)$$

```
> A5:=addrow(A4,2,3,-21);
```

$$A5 := \begin{bmatrix} 1 & -3 & 2 & 6 \\ 0 & 1 & -\frac{3}{7} & -\frac{2}{7} \\ 0 & 0 & 0 & -4 \end{bmatrix} \quad (5)$$

```
> # To swap rows, use syntax A6:=swaprow(A5,1,2);
> # or, this more natural syntax using macros:
  macro(swap=linalg[swaprow]);
  macro(mult=linalg[mulrow]);
  macro(combo=linalg[addrow]);
```

swap

swap, mult

swap, mult, combo (6)

```
> A1:=<1,-3,2,6|1,4,-1,4|5,6,1,20>^+;
```

$$A1 := \begin{bmatrix} 1 & -3 & 2 & 6 \\ 1 & 4 & -1 & 4 \\ 5 & 6 & 1 & 20 \end{bmatrix} \quad (7)$$

```
> A2:=combo(A1,1,2,-1);
```

$$A2 := \begin{bmatrix} 1 & -3 & 2 & 6 \\ 0 & 7 & -3 & -2 \\ 5 & 6 & 1 & 20 \end{bmatrix} \quad (8)$$

```
> A3:=combo(A2,1,3,-5);
```

$$A3 := \begin{bmatrix} 1 & -3 & 2 & 6 \\ 0 & 7 & -3 & -2 \\ 0 & 21 & -9 & -10 \end{bmatrix} \quad (9)$$

```
> A4:=mult(A3,2,1/7);
```

$$A4 := \begin{bmatrix} 1 & -3 & 2 & 6 \\ 0 & 1 & -\frac{3}{7} & -\frac{2}{7} \\ 0 & 21 & -9 & -10 \end{bmatrix} \quad (10)$$

```
> A5:=combo(A4,2,3,-21);
```

$$A5 := \begin{bmatrix} 1 & -3 & 2 & 6 \\ 0 & 1 & -\frac{3}{7} & -\frac{2}{7} \\ 0 & 0 & 0 & -4 \end{bmatrix} \quad (11)$$

```
> # To swap rows, use syntax A6:=swap(A5,1,2);
```