Matrices are referred to by the number of rows by the number of columns.

Solving for variables in a matrix. Examples:

1)
$$\begin{bmatrix} -3 & 8x \\ x+y & -1 \end{bmatrix} = \begin{bmatrix} -3 & 4 \\ -5 & -1 \end{bmatrix}$$
 2) $\begin{bmatrix} 4x-3 & 3y \\ 7 & 13 \end{bmatrix} = \begin{bmatrix} 9 & -15 \\ 7 & 2z+1 \end{bmatrix}$

4)

8x = 4	x + y = -5
x = 2 sub in ->	2 + y = -5
	y = -7
x = 2, y = -7	

$$4x - 3 = 9 3y = -15 13 = 2z + 1$$

$$4x = 12 y = -5 12 = 2z$$

$$x = 3 6 = z$$

$$x = 3, y = -5, z = 6$$

3)
$$\begin{bmatrix} x+3y\\ 3x+y \end{bmatrix} = \begin{bmatrix} -13\\ 1 \end{bmatrix}$$

 $x + 3y = -13 \qquad 3x + y = 1$ Solve as a system of equations. (substitution or elimination) x = -3y - 13 sub in -> 3(-3y-13) + y = 1-9y - 39 + y = 1-8y - 39 = 1-8y - 39 = 1-8y = 40 $x = -3(-5) - 13 \qquad (-sub in \qquad y = -5)$ x = 2x = 2, y = -5

$$\begin{bmatrix} f+h & 7 & -3j \\ f-j & 0 & -5 \\ 6 & 1 & 2h \end{bmatrix} = \begin{bmatrix} 11 & 7 & 9 \\ k & 0 & -5 \\ 3f+j & 1 & 16 \end{bmatrix}$$

 $\begin{array}{ccccccc} f+h=11 & -3j=9 & f-j=k & 6=3f+j & 2h=16 \\ & j=-3 & & h=8 \\ & & &$

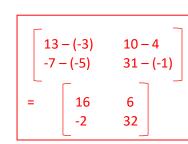
Operations with matrices. Addition/subtractions examples.

If
$$A = \begin{bmatrix} -3 & 4 \\ -5 & -1 \end{bmatrix}$$
 $B = \begin{bmatrix} 13 & 10 \\ -7 & 31 \end{bmatrix}$ $C = \begin{bmatrix} -6 & 9 & -2 \\ -5 & -3 & 8 \end{bmatrix}$
Find $B - A$ 7) Find $A + C$

-3 + 13 4 + 10 -5 - 7-1 + 31 10 14 = -12 30

Find A + B

5)



6)

Matrices much match in dimension to perform addition or subtraction, therefore A + C is not possible.

Multiplying by a scalar examples.

8)	Find 3A		9)	Find -4C
	3(-3) 3(4) = 3(-5) 3(-1) =	= [-9 12 -15 -3]		$\begin{bmatrix} -4(-6) & -4(9) & -4(-2) \\ -4(-5) & -4(-3) & -4(8) \end{bmatrix} = \begin{bmatrix} 24 & -36 & -8 \\ 20 & 12 & -32 \end{bmatrix}$
Mu	ltiplying matrices.	If A = $\begin{bmatrix} -3 & 4 \\ -5 & -1 \end{bmatrix}$	B = [1 	$ \begin{bmatrix} 3 & 10 \\ -7 & 31 \end{bmatrix} \qquad \mathbf{C} = \begin{bmatrix} -6 & 9 & -2 \\ -5 & -3 & 8 \end{bmatrix} \qquad \mathbf{D} = \begin{bmatrix} 6 & -6 \\ -1 & -2 \end{bmatrix} $

10) Find AB 11) Find BC

12) Find BD 0 7

AB = -3(13) + 4(-7) -3(10) + 4(31) -67 94 = -5(10) + -1(31)-5(13) + -1(-7)-58 -81

BD is impossible.

The number of columns in the first matrix must be the same as the number of rows in the second one.

BC = -13(-6) + 10(-5) 13(9) + 10(-3) 13(-2) + 10(8) -7(-6) + 31(-5) -7(9) + 31(-3) -7(-2) + 31(8) 28 54 87 = -113 -156 262 Applications.

School	First place	Second place	Third place
Central	4	7	3
Franklin	8	9	1
Hayes	10	5	3
Lincoln	3	3	6

The results from a quad swim meet for four schools is shown in the chart. If 7 points was awarded for each first place finish, 4 for second and 2 for third, in what order did the four schools finish?

								r -
4	7	3		7		4(7) + 7(4) + 3(2)		62
8	9	1	•	4	=	8(7) + 9(4) + 1(2)	=	94
10	5	3		2		10(7) + 5(4) + 3(2)		96
3	3	6				3(7) + 3(4) + 6(2)		45

1st place: Hayes 2nd place: Franklin 3rd place: Central 4th place: Lincoln