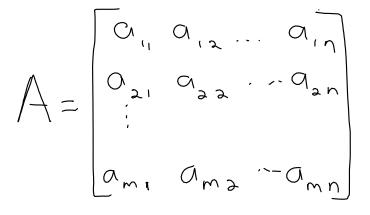
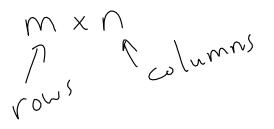
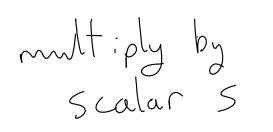
Thursday, September 15, 2016 2:33 PM

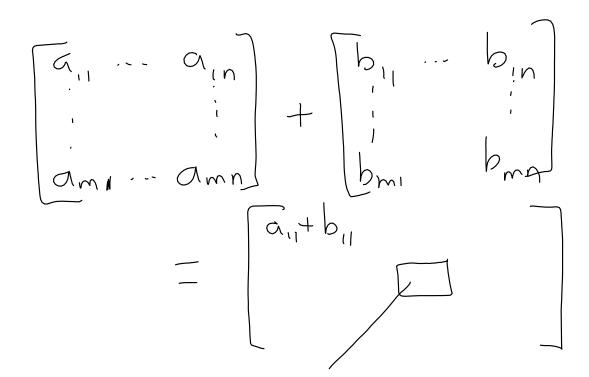








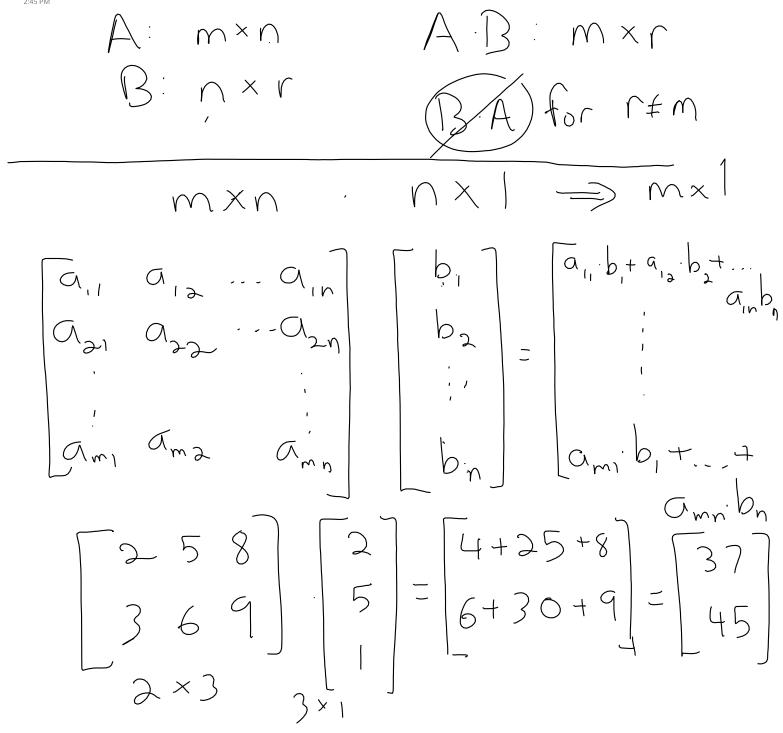
4 7 5



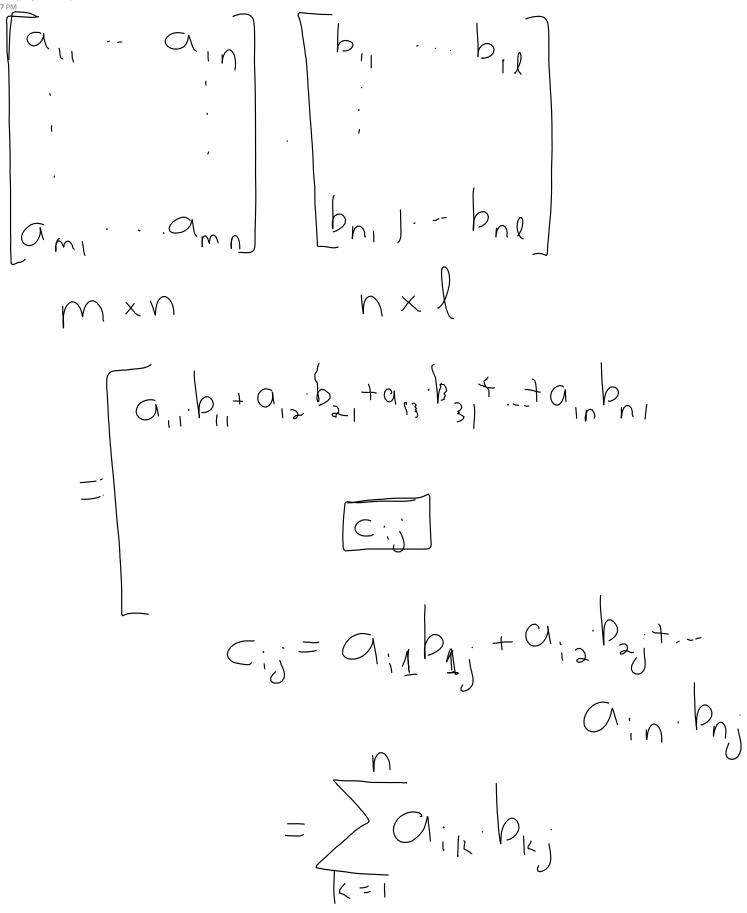
 $C_{ij} = O_{ij} + b_{ij}$ 

## Matrix Multiplication

Thursday, September 15, 2016 2:45 PM



Thursday, September 15, 201



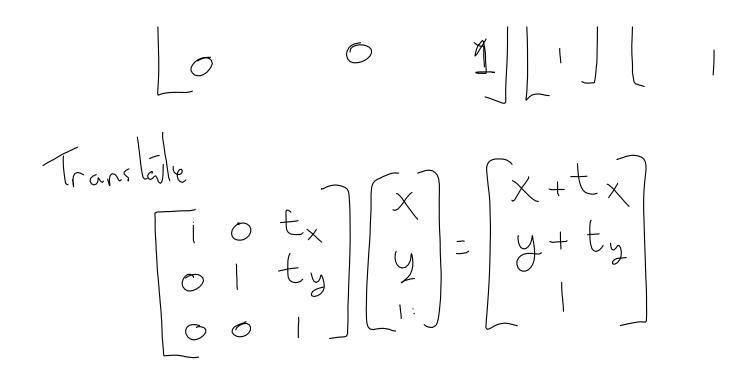
Thursday, September 15, 2016 3:02 PM 4  $\bigwedge$ 3 ζ 3×9  $A \cdot B = \begin{vmatrix} 2 + 15 + 40 \\ 3 + 18 + 45 \end{vmatrix}$ 1+26+48 6+24+5 12 57 66 8 3 X 3 18 28 61

Point (X) transform to (X) Scaling  $\begin{bmatrix} s_{X} & \sigma \\ \sigma & s_{Y} \end{bmatrix} \begin{bmatrix} X \\ Y \end{bmatrix} = \begin{bmatrix} s_{X} & X \\ s_{Y} & y \end{bmatrix}$ Rotati on Xcost - ysint Xsint + ycost Translation 

## 

Thursday, September 15, 2016

 $(X, y) \longrightarrow ($ Honrogeneous coord system (x,y,h) s.t.  $X = \frac{X_h}{I}$   $Y = \frac{Y_h}{I}$  $(x \cdot h, y \cdot h, h)$  $(\chi, \gamma, l)$ set h=1 Scale  $\begin{bmatrix} 5_{x} & 0 & 0 \\ 0 & 5_{y} & 0 \\ 0 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} X \\ Y \\ Z \\ Y \\ Z \end{bmatrix} = \begin{bmatrix} 5_{x} \cdot X \\ S_{y} \cdot Y \\ S_{y} \cdot Y \\ U \end{bmatrix}$  $O\left[X\right] = X \cos \Theta - y \sin \Theta$   $O\left[X\right] = X \sin \Theta + y \cos \Theta$ Lot. Cost Sint -sin O cos O



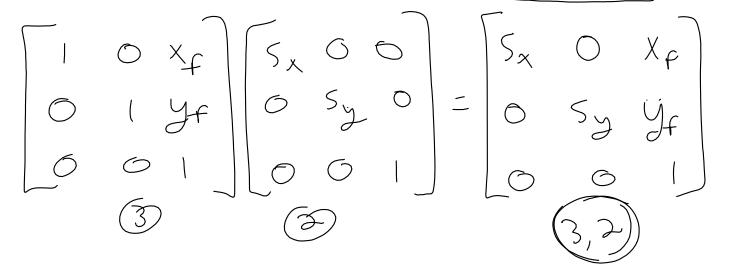
$$\frac{1}{2} = \frac{1}{2} \frac{$$

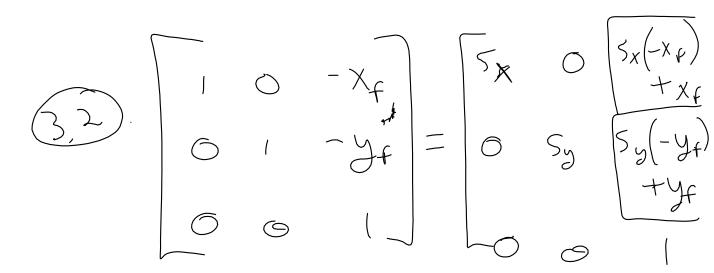
$$\int S_{x}(x - x_{p}) + X_{f}$$

$$\int S_{y}(y - y_{p}) + y_{f}$$

Thursday, September 15, 2016 3:31 PM

$$A(B(C(D)))$$
  $(A(B(C)))$ 





 $\begin{array}{cccc} & & & & \\ 5_{x} & & & \\ 0 & & \\ & & \\ 0 & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ \end{array} \begin{array}{c} & & \\ & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & \\ & & \\ & \\ & & \\ & & \\ & & \\ & & \\ & \\ & & \\ & \\ & & \\ & \\ & & \\ & \\ & & \\ & & \\ & \\ & \\ & & \\ &$ 

9-15 Page 12

 $\begin{bmatrix} S_x (X - X_f) \in X_f \\ S_y (Y - Y_f) + Y_f \\ \end{bmatrix}$ 

Thursday, September 15, 2016 3:44 PM

