Name:_____ Date:_____

PC: Applications of Matrices and Determinants

Do Now:

1. Given: $A=\begin{bmatrix} 5 & 0 & -3 \\ 0 & 12 & 4 \\ 1 & 6 & 3 \end{bmatrix}$ and $B=\begin{bmatrix} 10 & -5 & 5 \\ 30 & 0 & 10 \\ 0 & 10 & 1 \end{bmatrix}$

   (a) Find AB.
   (b) Find $\det(A)$
   (c) Find $\det(AB)$

The **area of a triangle** with vertices $(x_1, y_1), (x_2, y_2)$ and (x_3, y_3) is given by

$$\text{Area} = \pm \frac{1}{2} \text{determinant of} \begin{bmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{bmatrix}$$

where the symbol $\pm$ indicates that the appropriate sign should be chosen to yield a positive area.

1. Find the area of a triangle whose vertices are $(1,0), (2,2)$ and $(4,3)$.

2. Find the area of a triangle whose vertices are $(-3,5),(2,6)$ and $(3,-5)$.

Test for Collinear Points: Three points $(x_1,y_1),(x_2,y_2)$ and (x_3,y_3) are collinear (lie on the same line) if and only if

$$\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix} = 0 \quad \text{(the determinant = 0)}$$

3. Determine whether the points $(-2,-2),(1,1)$ and $(7,5)$ lie on the same line.

4. Determine whether the points $(3,-1),(0,-3)$ and $(12,5)$ are collinear.

The test for collinear points can be adapted to another use. If you have two points on a rectangular coordinate system, you can find the equation of the line passing through the two points.

5. Find an equation of a line that passes through $(2,4)$ and $(-1,3)$.

6. Find an equation of a line that passes through $(4,3)$ and $(2,2)$.

Homework: Textbook pp.646-647 #s 5, 7, 23, 25, 27, 29 (For 23 and 25, determine if those points are collinear without your calculator.)