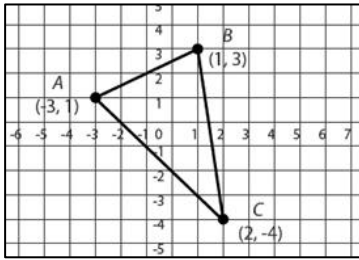


**Aim: What are some applications of determinants?****I. Do Now:**

1. Find the area of  $\triangle ABC$  by enclosure.



2. Find  $\begin{vmatrix} -3 & 1 & 1 \\ 1 & 3 & 1 \\ 2 & -4 & 1 \end{vmatrix}$

and use your graphing calculator to check.

3. Find the equation of the line containing the points (3, 1) and (0, 7).

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

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

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

**III. Applications**

4. Use the formula above to check your answer to #1.

5. Find the area of  $\triangle DEF$ , where  $D(3, 1)$ ,  $E(-1.5, 0.4)$ , and  $F(0.8, -3)$ .

6. Find the area of  $\triangle GHI$ , where  $G(-4, -9)$ ,  $H(0, -1)$ , and  $I(2, 3)$ . What is the significance of your answer?

**IV. Theorem: Three points  $(x_1, y_1)$ ,  $(x_2, y_2)$ , and  $(x_3, y_3)$  are \_\_\_\_\_ if and only if**

$$\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix} = \underline{\hspace{2cm}}$$

**V. Motivation: How could we solve #3 using matrices?**

7. Find the equation of the line passing through the points (8, 0) and (8, 8).

**HW53**

- p. 556: 5, 6, 10, 11, 13, 14, 17, 41, 42
- p. 545: 24