

Instructions: Show all work. Use exact answers unless specifically asked to round. You should do problems by hand and only check your work in the calculator. Answers only will receive minimal credit.

1. Calculate the determinants (by hand) of the following matrices using the cofactor method. Use as few calculations as possible.

a.
$$\begin{vmatrix} 9 & -3 & 7 & -8 \\ 1 & 0 & 4 & 2 \\ 1 & 0 & 0 & -1 \\ -2 & 0 & -1 & 3 \end{vmatrix}$$

$$-(-3) \begin{vmatrix} 1 & 4 & 2 \\ 1 & 0 & -1 \\ -2 & -1 & 3 \end{vmatrix} = 3 \left[-1 \begin{vmatrix} 4 & 2 \\ -1 & 3 \end{vmatrix} + 0 \begin{vmatrix} 1 & 2 \\ -2 & 3 \end{vmatrix} - (-1) \begin{vmatrix} 1 & 4 \\ -2 & -1 \end{vmatrix} \right] =$$

$$3 \left[-(12 + 2) + (-1 + 8) \right] =$$

$$3 \left[-14 + 7 \right] = 3(-7) = -21$$

b.
$$\begin{vmatrix} 3 & 0 & 0 & 0 \\ 1 & -2 & 0 & 0 \\ -7 & 9 & 5 & 0 \\ 6 & 4 & 2 & 1 \end{vmatrix} = 3(-2)(5)(1) = -30$$

c. Show that $\begin{vmatrix} 2 & 1 \\ -1 & 4 \end{vmatrix} = - \begin{vmatrix} -1 & 4 \\ 2 & 1 \end{vmatrix}$

$$\begin{aligned} & \swarrow \\ & 8 - (-1) = -[-1 - 8] = \\ & = 9 \qquad \qquad \qquad -(-9) = 9 \quad \checkmark \end{aligned}$$