Lesson 8. Cramer's Rule, Applications to Economic Models

0 Warm up

Example 1. Find the following determinants:

a. $\begin{vmatrix} 2 & 3 & 0 \\ 0 & 4 & 5 \\ 6 & 0 & 7 \end{vmatrix}$ b. $\begin{vmatrix} 8 & 3 & 0 \\ 3 & 4 & 5 \\ -1 & 0 & 7 \end{vmatrix}$ c. $\begin{vmatrix} 2 & 8 & 0 \\ 0 & 3 & 5 \\ 6 & -1 & 7 \end{vmatrix}$ d. $\begin{vmatrix} 2 & 3 & 8 \\ 0 & 4 & 3 \\ 6 & 0 & -1 \end{vmatrix}$

a. $\begin{vmatrix} 2 & 3 & 0 \\ 0 & 4 & 5 \\ 6 & 0 & 7 \end{vmatrix} = 2\begin{vmatrix} 4 & 5 \\ 0 & 7 \end{vmatrix} + 6\begin{vmatrix} 3 & 0 \\ 4 & 5 \end{vmatrix} = 56 + 90 = 146$

b. $\begin{vmatrix} 8 & 3 & 0 \\ 3 & 4 & 5 \\ -1 & 0 & 7 \end{vmatrix} = 8\begin{vmatrix} 4 & 5 \\ 0 & 7 \end{vmatrix} - 3\begin{vmatrix} 3 & 5 \\ -1 & 7 \end{vmatrix} = 8(28) - 3(26) = 146$

c. $\begin{vmatrix} 2 & 8 & 0 \\ 0 & 3 & 5 \\ 6 & -1 & 7 \end{vmatrix} = 2\begin{vmatrix} 3 & 5 \\ -1 & 7 \end{vmatrix} - 8\begin{vmatrix} 0 & 5 \\ 6 & 7 \end{vmatrix} = 2(26) - 8(-30) = 292$

d. $\begin{vmatrix} 2 & 3 & 8 \\ 0 & 4 & 3 \\ 6 & 0 & -1 \end{vmatrix} = 2\begin{vmatrix} 4 & 3 \\ 0 & -1 \end{vmatrix} + 6\begin{vmatrix} 3 & 8 \\ 4 & 3 \end{vmatrix} = 2(-4) + 6(-23) = -146$