MORE PRACTICE - Determinants

Find the value of the determinant:

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

$4(-1) - (3)(2)$

$-4 - 6$

-10

2. $\begin{vmatrix} -1 & 7 \\ 1 & 3 \end{vmatrix}$

$(-1)(3) - (1)(7)$

$-3 - 7$

-10

3. $\begin{vmatrix} -6 & 2 \\ -3 & 1 \end{vmatrix}$

$(-6)(1) - (-3)(2)$

$-6 + 6$

0

4. $\begin{vmatrix} 2 & 0 & 1 \\ 1 & 3 & 3 \\ -2 & -5 & 1 \end{vmatrix}$

$2\begin{vmatrix} 3 & 3 \\ -5 & 1 \end{vmatrix} - 0\begin{vmatrix} 1 & 3 \\ -2 & 1 \end{vmatrix} + 1\begin{vmatrix} 1 & 3 \\ -2 & -5 \end{vmatrix}$

$2(3+15) - 0 + 1(-5+6)$

$2(18) + 0 + 1(1)$

$= 36 + 1 = 37$

5. $\begin{vmatrix} 3 & 2 & -1 \\ 1 & 4 & 3 \\ 0 & 5 & -2 \end{vmatrix}$

$3\begin{vmatrix} 4 & 3 \\ 5 & -2 \end{vmatrix} - 2\begin{vmatrix} 1 & 3 \\ 0 & -2 \end{vmatrix} + -1\begin{vmatrix} 1 & 4 \\ 0 & 5 \end{vmatrix}$

$3(-8-15) - 2(-2-0) - 1(5-0)$

$3(-23) - 2(-2) - 1(5)$

$-69 + 4 - 5 = -70$

6. $\begin{vmatrix} 1 & 5 & -3 \\ 2 & 2 & 1 \\ 1 & -3 & 4 \end{vmatrix}$

$1\begin{vmatrix} 2 & 1 \\ -3 & 4 \end{vmatrix} - 5\begin{vmatrix} 2 & 1 \\ 1 & 4 \end{vmatrix} + -3\begin{vmatrix} 2 & 2 \\ 1 & -3 \end{vmatrix}$

$1(8+3) - 5(8-1) - 3(-6-2)$

$1(11) - 5(7) - 3(-8) = 11 - 35 + 24 = 0$

7. Find x if $\begin{vmatrix} x & 2 \\ -3 & 2 \end{vmatrix} = 0$

$2x - (2)(-3) = 0$

$2x + 6 = 0$

$2x = -6 \quad x = -3$

8. Find x if $\begin{vmatrix} 4x & 2 \\ -x & 5 \end{vmatrix} = 11$

$(4x)(5) - (2)(-x) = 11$

$20x + 2x = 11$

$22x = 11$

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

9. Find x if $\begin{vmatrix} -2 & 2x \\ -x & 1 \end{vmatrix} = 6$

$(-2)(1) - (2x)(-x) = 6$

$-2 + 2x^2 = 6$

$2x^2 = 8$

$x^2 = 4 \quad x = \pm 2$