MATH 1210 Problem Workshop 10

1. Evaluate the following determinants. Simplify the second answer as much as possible.

   (a) $\begin{vmatrix} 2 & 1 & -3 & 0 \\ 4 & 2 & 1 & 5 \\ -3 & 3 & -2 & 2 \\ 4 & 5 & 2 & -4 \end{vmatrix}$

   (b) $\begin{vmatrix} x & x^2 & x^3 \\ y & y^2 & y^3 \\ z & z^2 & z^3 \end{vmatrix}$

2. Evaluate the following determinants. Simplify the second answer as much as possible.

   (a) $\begin{vmatrix} 4 & 6 & 2 & 2 \\ 2 & 4 & 6 & 8 \\ -3 & -2 & -1 & 1 \\ 2 & 5 & 7 & 2 \end{vmatrix}$

   (b) $\begin{vmatrix} a+b & a & a & a & a \\ a & a+b & a & a & a \\ a & a & a+b & a & a \\ a & a & a & a+b & a \\ a & a & a & a & a+b \end{vmatrix}$

3. Use Cramer's Rule, if possible, to find the value of z satisfying the equations

$$\begin{aligned} x + 2y - 3z + 6w &= 0 \\ 2x - y + w &= 0 \\ 5y + z - 2w &= 0 \\ x + y + z + w &= 0 \end{aligned}$$

4. Use Cramer's Rule, if possible, to find the value of z satisfying the equations

$$\begin{aligned} x + y - 3z &= 5 \\ 2x + 2y - w &= 0 \\ 3x - 2y + z &= 1 \\ 3y + 2z - w &= 0 \end{aligned}$$

Answers

1. (a) 891 (b) $xyz(y-x)(z-x)(z-y)$
2. (a) 384 (b) $5ab^4 + b^5$
3. $z = 0$.
4. $z = 1$.