**JESUS AND MARY SCHOOL AND COLLEGE**

**CLASS-12 ( MATHS )**

**CHAPTER NAME – DETERMINANTS**

**WORKSHEET-3**

**Pleasec refer to the video prepared for this chapter.** Date : 18/05/2020

**Q.1.** Using properties of determinants, show that$ \left| \begin{matrix}1&x+y&x^{2}+y^{2}\\1&y+z&y^{2}+z^{2}\\1&z+x&z^{2}+x^{2}\end{matrix} \right|=\left(x-y\right)\left(y-z\right)(z-x)$.

**Q.2.** Using properties of determinants, show that $\left| \begin{matrix}1&1&1\\ a&b&c\\b+c&c+a&a+b\end{matrix} \right|=0$.

**Q.3.** Using properties of determinants, show that $\left| \begin{matrix}x+λ&x&x\\ x&x+λ&x\\x&x&x+λ\end{matrix} \right|=λ^{2}(3x+λ)$.

**Q.4.** Using properties of determinants, evaluate: $\left| \begin{matrix}a-b&b-c&c-a\\b-c&c-a&a-b\\c-a&a-b&b-c\end{matrix} \right|$.

**Q.5.** Solve the equation: $\left| \begin{matrix}15-2x&11&10\\ 11-3x&17&16\\7-x&14&13\end{matrix} \right|=0$.

**Q.6.** Using properties of determinants, prove that

$\left| \begin{matrix}a&a^{2}&b+c\\b&b^{2}&a+c\\c&c^{2}&a+b\end{matrix} \right|=\left(b-c\right)\left(c-a\right)\left(a-b\right)(a+b+c)$.

**Q.7.** Using properties of determinants, prove that $\left| \begin{matrix}1&x&x^{3}\\1&y&y^{3}\\1&z&z^{3}\end{matrix} \right|=\left(x-y\right)\left(y-z\right)\left(z-x\right)(x+y+z)$.

**Q.8.** Using properties of determinants, prove that $\left| \begin{matrix}1&1&1\\α&β&γ\\βγ&γα&αβ\end{matrix} \right|=\left(α-β\right)\left(β-γ\right)\left(γ-α\right)$.

**Q.9.** Using properties of determinants, prove that $\left| \begin{matrix}1&bc&bc(b+c)\\1&ca&ca(c+a)\\1&ab&ab(a+b)\end{matrix} \right|=0$.

**Q.10.** Using properties of determinants, prove that $\left| \begin{matrix}x&y&z\\x^{2}&y^{2}&z^{2}\\x^{3}&y^{3}&z^{3}\end{matrix} \right|=xyz\left(x-y\right)\left(y-z\right)\left(z-x\right)$.

**Q.11.** Using properties of determinants, prove that $\left| \begin{matrix}x+a&b&c\\a&x+b&c\\a&b&x+c\end{matrix} \right|=x^{2}(x+a+b+c)$

**Q.12.** Using properties of determinants, prove that $\left| \begin{matrix}1+a\_{1}&a\_{2}&a\_{3}\\a\_{1}&1+a\_{2}&a\_{3}\\a\_{1}&a\_{2}&1+a\_{3}\end{matrix} \right|=1+a\_{1}+a\_{2}+a\_{3}$.

**Q.13.** Using properties of determinants, prove that

 $\left| \begin{matrix}a&b-c&c-b\\a-c&b&c-a\\a-b&b-a&c\end{matrix} \right|=\left(a+b-c\right)\left(b+c-a\right)(c+a-b)$

**Q.14.** Using properties of determinants, prove that $\left| \begin{matrix}a^{2}&bc&ac+c^{2}\\a^{2}+ab&b^{2}&ac\\ab&b^{2}+bc&c^{2}\end{matrix} \right|=4a^{2}b^{2}c^{2}$.

**Q.15.** Using properties of determinants, find the value of the following determinant:

$$\left|\begin{matrix}x^{3}&x^{2}&x\\y^{3}&y^{2}&y\\z^{3}&z^{2}&z\end{matrix}\right|$$

**Note**- **Please do this assignment in your copies. It will be checked when the school re-opens.**

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