# Quiz 12 Determinants I.

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You are given

$$A = \begin{bmatrix} 1 & 1 & 2 \\ 2 & 1 & 3 \\ 1 & 1 & 1 \end{bmatrix}, \; A^{-1} = \begin{bmatrix} -2 & 1 & 1 \\ 1 & -1 & 1 \\ 1 & 0 & -1 \end{bmatrix} \text{ and } B = \begin{bmatrix} t \\ 2 \\ 1 \end{bmatrix}.$$

Answer the following questions.

- Give the solution of the equation $AX = B$ by the most effective use of the given information.

  **Answer:** The answer is given by $X = A^{-1}B$ and so $X = \begin{bmatrix} -2\,t + 3 \\ t - 1 \\ t - 1 \end{bmatrix}$.

- Calculate the determinant of the matrix $P = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 3 & 4 \\ -s & s^2 & 1 \end{bmatrix}$, using the Sarrus formula or expansion by a convenient row.

  **Answer:** It evaluates to $-s(4-3) - s^2(2) + 1(1)$.

- Use your calculation to find all values of $s$ for which $P$ is singular (i.e. has no inverse).

  **Answer:** The quadratic formula gives $s = -1, 1/2$ to make $det(P) = 0$.

- For meditation Determinants are a quick way to avoid long REF calculations

problem. They are also handy to create examples of matrices with desired properties.

**Answer:** We shall do this soon.