

$$12. A) A = \begin{pmatrix} 4 & -3 \\ 5 & 1 \end{pmatrix} = \underline{\underline{\cancel{4+15} = \cancel{19}}}$$

$$f(x) = x^2 - 2x$$

$$= \begin{pmatrix} 16-15 & -12 \overset{-3}{\cancel{+5}} \\ 20+5 & -15+1 \end{pmatrix} - 2 \begin{pmatrix} 4 & -3 \\ 5 & 1 \end{pmatrix}$$

$$= \begin{pmatrix} \cancel{1-8} & \cancel{-7+6} \\ \cancel{25-10} & \cancel{-14-2} \end{pmatrix} \begin{pmatrix} 1-8 & -15+6 \\ 25-10 & -14-2 \end{pmatrix} = \begin{pmatrix} -7 & -9 \\ 15 & -16 \end{pmatrix}$$

$$22. a) \begin{vmatrix} -1 & 2 & 0 \\ 3 & 1 & 4 \\ 2 & -3 & 5 \end{vmatrix} = -5 + 0 + 16 - (0 + 12 + 30) \\ = \overset{11}{\cancel{8}} - 42 = \cancel{-33} - 31$$

$$b) \begin{vmatrix} a^2+1 & ab & ac \\ ab & b^2+1 & bc \\ ac & bc & c^2+1 \end{vmatrix} = a^2b^2c^2 + a^2b^2 + a^2c^2 + b^2c^2 + a^2 + b^2 \\ + c^2 + 1 + a^2b^2c^2 + a^2b^2c^2 - (a^2b^2c \\ + a^2c^2 + a^2b^2c^2 + a^2b^2 + a^2b^2c^2 + b^2 \\ = a^2 + b^2 + c^2 + 1$$