The 3 row operations affect the determinate in 3 ways:

① Flipping an adjacent row negates the original determinate matrix (B)

$$\overset{A}{\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}} \overset{B}{\begin{bmatrix} 0 & 2 & 1 \\ 1 & -2 & -3 \\ -1 & 1 & 2 \end{bmatrix}} = \overset{(A \times B)}{\begin{bmatrix} 1 & -2 & -3 \\ 0 & 2 & 1 \\ -1 & 1 & 2 \end{bmatrix}}$$

Det A	·	Det B	=	Det(A×B)
-1		1		-1

② When multiplying a matrix by a scaler the original determinat matrix (B) is also multiplied by that scaler

$$\overset{A}{\begin{bmatrix} 5 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}} \overset{B}{\begin{bmatrix} 0 & 2 & 1 \\ 1 & -2 & -3 \\ -1 & 1 & 2 \end{bmatrix}} = \overset{(A \times B)}{\begin{bmatrix} 0 & 10 & 5 \\ 1 & -2 & -3 \\ -1 & 1 & 2 \end{bmatrix}}$$

Det A	·	Det B	=	Det(A×B)
5		1		5

③ When a linear combination of the rows is applied to the matrix no change to the determinate happens

$$\begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0 & 2 & 1 \\ 1 & -2 & -3 \\ -1 & 1 & 2 \end{bmatrix} = \begin{bmatrix} 1 & 0 & -2 \\ 1 & -2 & -3 \\ -1 & 1 & 2 \end{bmatrix} \; R_2 + R_1 \rightarrow$$

Det A	·	Det B	=	Det (A×B)
1		1		1

You can use Gaussian Elimination to find the determinate of a matrix

example $\begin{bmatrix} 0 & 2 & 1 \\ 1 & -2 & -3 \\ -1 & 1 & 2 \end{bmatrix} = A$ the determinate should end up being 1 (by graphing calc)

start with switching R_1 & R_2 this makes Det A multiply (-1) ① $\begin{bmatrix} 1 & -2 & -3 \\ 0 & 2 & 1 \\ -1 & 1 & 2 \end{bmatrix}$

Then $R_1 + R_3 \to R_3$ linear combo has no effect on the determinate ② $\begin{bmatrix} 1 & -2 & -3 \\ 0 & 2 & 1 \\ 0 & -1 & -1 \end{bmatrix}$

next multiply ½ to R_2 making det ½ of original ③ $\begin{bmatrix} 1 & -2 & -3 \\ 0 & 1 & \frac{1}{2} \\ 0 & -1 & -1 \end{bmatrix}$

Then $R_2 + R_3 \to R_3$ again linear combo has no effect on Det ④ $\begin{bmatrix} 1 & -2 & -3 \\ 0 & 1 & \frac{1}{2} \\ 0 & 0 & -\frac{1}{2} \end{bmatrix}$

at this point a triangle of zero's is made so the diagonal is the altered matrix determinate

$\begin{bmatrix} 1 & -2 & -3 \\ 0 & 1 & \frac{1}{2} \\ 0 & 0 & -\frac{1}{2} \end{bmatrix}$

Altered matrix det $= 1 \cdot 1 \cdot -\frac{1}{2} = -\frac{1}{2}$

Therefore

$$\text{Det } A \cdot \underbrace{(-1)}_{\text{step 1 change}} \cdot \underbrace{\left(\tfrac{1}{2}\right)}_{\text{step 3 change}} = \underbrace{-\tfrac{1}{2}}_{\text{altered matrix Det}}$$

& $\text{Det } A = -\frac{1}{2}(-1)(2) = 1$:)