In this worksheet you will compute the determinant of the following matrics using only the following three properties:

1. The determinant of the identity matrix is 1.

2. The determinant swaps signs if you swap two rows.

3. The determinant is linear in each row. E.g,

$$\begin{vmatrix} cR_1 \\ R_2 \\ \vdots \\ R_m \end{vmatrix} = c \begin{vmatrix} R_1 \\ R_2 \\ \vdots \\ R_m \end{vmatrix}$$

and

$$\begin{vmatrix} R_1 + \hat{R}_1 \\ R_2 \\ \vdots \\ R_m \end{vmatrix} = \begin{vmatrix} R_1 \\ R_2 \\ \vdots \\ R_m \end{vmatrix} + \begin{vmatrix} \hat{R}_1 \\ R_2 \\ \vdots \\ R_m \end{vmatrix}$$

and similarly for the other rows.

1. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

2. $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

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

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

5. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$

6. $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$

7. $\begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix}$

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

9. $\begin{bmatrix} 0 & 1 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

10. $\begin{bmatrix} 5 & 1 & 3 \\ 5 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix}$

11. $\begin{bmatrix} 0 & 0 & 0 \\ 5 & 1 & 3 \\ -1 & 1 & 4 \end{bmatrix}$

12. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 4 & 0 & 1 \end{bmatrix}$

13. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & -2 \\ 0 & 0 & 1 \end{bmatrix}$

14. $\begin{bmatrix} 5 & 1 & 3 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

15. $\begin{bmatrix} 5 & 1 & 3 \\ 0 & 2 & 0 \\ 0 & 0 & 4 \end{bmatrix}$

16. $\begin{bmatrix} 5 & 1 & 3 \\ 0 & 2 & 8 \\ 0 & 0 & 4 \end{bmatrix}$

17. $\begin{bmatrix} 5 & 1 & 3 \\ 1 & 2 & 8 \\ 0 & 0 & 4 \end{bmatrix}$

18. $\begin{bmatrix} 5 & 1 & 3 \\ 1 & 2 & -1 \\ 0 & 1 & 4 \end{bmatrix}$

19. $\begin{bmatrix} 5 & 1 & 3 \\ 1 & 2 & -1 \\ 2 & 1 & 4 \end{bmatrix}$