Definitheit und Hesse-Matrix

Stufe 2: Hauptminoren

Name: _____ Datum: _____

Berechne die führenden Hauptminoren D1, D2, D3 (Determinanten der linken oberen Teilmatrizen).

1) $A = \begin{pmatrix} 2 & 1 & -1 \\ 1 & 3 & 2 \\ -1 & 2 & -3 \end{pmatrix}$ _____

2) $A = \begin{pmatrix} -1 & 0 & 0 \\ 0 & 5 & -2 \\ 0 & -2 & -2 \end{pmatrix}$ _____

3) $A = \begin{pmatrix} -2 & 0 & 1 \\ 0 & -3 & 0 \\ 1 & 0 & 1 \end{pmatrix}$ _____

4) $A = \begin{pmatrix} 5 & 1 & -1 \\ 1 & 5 & 0 \\ -1 & 0 & -1 \end{pmatrix}$ _____

5) $A = \begin{pmatrix} 3 & -1 & -2 \\ -1 & 2 & -1 \\ -2 & -1 & 2 \end{pmatrix}$ _____

6) $A = \begin{pmatrix} -1 & 1 & 2 \\ 1 & 4 & 0 \\ 2 & 0 & -2 \end{pmatrix}$ _____

7) $A = \begin{pmatrix} 1 & 0 & 1 \\ 0 & -1 & 0 \\ 1 & 0 & -3 \end{pmatrix}$ _____

8) $A = \begin{pmatrix} 5 & -1 & -1 \\ -1 & 4 & 1 \\ -1 & 1 & 0 \end{pmatrix}$ _____

9) $A = \begin{pmatrix} 3 & 2 & 0 \\ 2 & -2 & 1 \\ 0 & 1 & -1 \end{pmatrix}$ _____

10) $A = \begin{pmatrix} 3 & -1 & 1 \\ -1 & -1 & 1 \\ 1 & 1 & 4 \end{pmatrix}$ _____

11) $A = \begin{pmatrix} 2 & 1 & 0 \\ 1 & 3 & 0 \\ 0 & 0 & -2 \end{pmatrix}$ _____

12) $A = \begin{pmatrix} -1 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 4 \end{pmatrix}$ _____

13) $A = \begin{pmatrix} 5 & -1 & 2 \\ -1 & 5 & -2 \\ 2 & -2 & -1 \end{pmatrix}$ _____

14) $A = \begin{pmatrix} 5 & -2 & -1 \\ -2 & 0 & -2 \\ -1 & -2 & -3 \end{pmatrix}$ _____

15) $A = \begin{pmatrix} 5 & -1 & 2 \\ -1 & 2 & -2 \\ 2 & -2 & -2 \end{pmatrix}$ _____

16) $A = \begin{pmatrix} 4 & -1 & -1 \\ -1 & -1 & -1 \\ -1 & -1 & 0 \end{pmatrix}$ _____

Lösungen: Definitheit und Hesse-Matrix

Stufe 2: Hauptminoren

1) $D_1 = 2,\ D_2 = 5,\ D_3 = -30 \Rightarrow$ indefinit

2) $D_1 = -1,\ D_2 = -5,\ D_3 = 14 \Rightarrow$ indefinit

3) $D_1 = -2,\ D_2 = 6,\ D_3 = 9 \Rightarrow$ indefinit

4) $D_1 = 5,\ D_2 = 24,\ D_3 = -29 \Rightarrow$ indefinit

5) $D_1 = 3,\ D_2 = 5,\ D_3 = -5 \Rightarrow$ indefinit

6) $D_1 = -1,\ D_2 = -5,\ D_3 = -6 \Rightarrow$ indefinit

7) $D_1 = 1,\ D_2 = -1,\ D_3 = 4 \Rightarrow$ indefinit

8) $D_1 = 5,\ D_2 = 19,\ D_3 = -7 \Rightarrow$ indefinit

9) $D_1 = 3,\ D_2 = -10,\ D_3 = 7 \Rightarrow$ indefinit

10) $D_1 = 3,\ D_2 = -4,\ D_3 = -20 \Rightarrow$ indefinit

11) $D_1 = 2,\ D_2 = 5,\ D_3 = -10 \Rightarrow$ indefinit

12) $D_1 = -1,\ D_2 = 2,\ D_3 = 10 \Rightarrow$ indefinit

13) $D_1 = 5,\ D_2 = 24,\ D_3 = -56 \Rightarrow$ indefinit

14) $D_1 = 5,\ D_2 = -4,\ D_3 = -16 \Rightarrow$ indefinit

15) $D_1 = 5,\ D_2 = 9,\ D_3 = -38 \Rightarrow$ indefinit

16) $D_1 = 4,\ D_2 = -5,\ D_3 = -5 \Rightarrow$ indefinit