

高等代数(工)①测试题 1

01. 设行列式 $\begin{vmatrix} x-2 & x-1 & x-2 & x-3 \\ 2x-2 & 2x-1 & 2x-2 & 2x-3 \\ 3x-3 & 3x-2 & 4x-5 & 3x-3 \\ 4x & 4x-3 & 5x-7 & 4x-3 \end{vmatrix}$ 为 $f(x)$,

则方 $f(x)=0$ 的根的个数为:

02. 证明:

$$\begin{vmatrix} a_1^3 & a_2^3 & a_3^3 & a_4^3 \\ a_1^2 b_1 & a_2^2 b_2 & a_3^2 b_3 & a_4^2 b_4 \\ a_1 b_1^2 & a_2 b_2^2 & a_3 b_3^2 & a_4 b_4^2 \\ b_1^3 & b_2^3 & b_3^3 & b_4^3 \end{vmatrix} =$$

$$(a_1 b_2 - a_2 b_1)(a_1 b_3 - a_3 b_1)$$

$$(a_1 b_4 - a_4 b_1)(a_2 b_3 - a_3 b_2)$$

$$(a_2 b_4 - a_4 b_2)(a_3 b_4 - a_4 b_3)$$

03. $\begin{vmatrix} a & b & c & d \\ a & a+b & a+b+c & a+b+c+d \\ a & 2a+b & 3a+2b+c & 4a+3b+2c+d \\ a & 3a+b & 6a+3b+c & 10a+6b+3c+d \end{vmatrix}$

04. $\begin{vmatrix} 1 & 2 & 3 & \dots \\ -1 & 0 & 3 & \dots \\ -1 & -2 & 0 & \dots \\ \vdots & \vdots & \vdots & \ddots \\ -1 & -2 & -3 & \dots \end{vmatrix}$

05. 证明: $\begin{vmatrix} \sin^2 \alpha & \cos^2 \alpha & \cos^2 \alpha \\ \sin^2 \beta & \cos^2 \beta & \cos 2\beta \\ \sin^2 \gamma & \cos^2 \gamma & \cos 2\gamma \end{vmatrix}$

06. $\begin{vmatrix} 1+a_1 & 1 & \dots \\ 2 & 2+a_2 & \dots \\ \vdots & \vdots & \ddots \\ n & n & \dots \end{vmatrix}$

07. $\begin{vmatrix} x & a & \dots \\ a & x & \dots \\ \vdots & \vdots & \ddots \\ a & a & \dots \end{vmatrix}$

08. $\begin{vmatrix} x+1 & x & x & \dots \\ x & x+\frac{1}{2} & x & \dots \\ x & x & x+\frac{1}{3} & \dots \\ \vdots & \vdots & \vdots & \ddots \\ x & x & x & \dots \end{vmatrix}$

09. $\begin{vmatrix} a & c & c & c & c & \dots \\ b & a & c & c & c & \dots \\ b & b & a & c & c & \dots \\ b & b & b & a & c & \dots \\ b & b & b & b & a & \dots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \ddots \\ b & b & b & b & b & \dots \end{vmatrix}$

10. $\begin{vmatrix} a & \dots & \dots & \dots \\ \vdots & \ddots & \vdots & \vdots & \vdots & \vdots \\ 0 & \dots & \dots & \dots & \dots \\ 0 & \dots & \dots & \dots & \dots \\ 0 & \dots & \dots & \dots & \dots \\ \vdots & \ddots & \vdots & \vdots & \vdots & \vdots \\ c & \dots & \dots & \dots & \dots \end{vmatrix}$

11. $\begin{vmatrix} 1 & 1 & 1 & \dots & 1 \\ 1 & C_2^1 & C_3^1 & \dots & C_n^1 \\ 1 & C_3^2 & C_4^2 & \dots & C_{n+1}^2 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ 1 & C_{n-1}^{n-2} & C_n^{n-2} & \dots & C_{2n-3}^{n-2} \\ 1 & C_n^{n-1} & C_{n+1}^{n-1} & \dots & C_{2n-2}^{n-1} \end{vmatrix}$

12. $\begin{vmatrix} 1 & 1 & 1 & \dots \\ 2 & 2^2 & 2^3 & \dots \\ 3 & 3^2 & 3^3 & \dots \\ \vdots & \vdots & \vdots & \ddots \\ n & n^2 & n^3 & \dots \end{vmatrix}$

注①: 未标注类型即为计算。

注②: 有问题请找:

1&2 题: 何巡石; 3&4&5 题: 王楠; 6&7&8: 胡玉林;

9&10&11: 张欣雨; 12: 魏汝钢; 码字: 段育凯