SOLUTION

P 103. Show that the n-th ordered continuant

$$\begin{vmatrix} a & b & 0 & 0 & 0 & \dots & 0 \\ c & a & b & 0 & 0 & \dots & 0 \\ 0 & c & a & b & 0 & \dots & 0 \\ \dots \\ \dots \\ 0 & 0 & 0 & \dots & c & a & b \\ 0 & 0 & 0 & \dots & 0 & c & a \end{vmatrix}$$

$$= \prod_{r=1}^{n} \left[a + 2 \cos \left(\frac{r\pi}{n+1}\right)\right], \qquad \text{if } bc = 1$$

$$= \prod_{r=1}^{n} \left[a + 2i \cos \left(\frac{r\pi}{n+1}\right)\right], \qquad \text{if } bc = -1 .$$

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Solutions of this problem were submitted by M. Brisebois, D. Lind, M. Murdeshwar, S. Spital and the proposer, several of whom gave references for the solution of this and more general problems. For example Lind points out that the formula $\prod_{r=1}^{n} (a-2\sqrt{bc} \cos (\frac{r\pi}{n+1}))$ for the continuant can be found in Muir, Theory of Determinants, vol. 4, p. 401.

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