CORRESPONDENCE

To the Editor, *The Mathematical Gazette*

DEAR SIR,

C. P. Willans in his article "On Formulae for the Nth Prime Number" does indeed produce such a formula. The results do not, however, appear to solve any prime number problems. His formula is:

$$p_n = 2 + \sum_{m=2}^{2^n} C_n\{\pi(m)\}$$

where $C_n(a) = 1$ for $a < n$; $C_n(a) = 0$ for $a \geq n$.

Now by definition of $\pi(m)$ as the number of primes $\leq m$,

$$\pi(m) \gtreqless n \quad \text{for} \quad m \gtreqless p_n$$

and hence

$$\begin{aligned} C_n\{\pi(m)\} &= 0 \quad \text{for} \quad m \geq p_n \\ &= 1 \quad \text{for} \quad m < p_n \end{aligned}$$

Thus Willans' formula reduces to:

$$p_n = 2 + \sum_{m=2}^{p_n - 1} 1 = 2 + (p_n - 1) - 1 = p_n$$

Yours faithfully, T. B. M. NEILL and M. SINGER

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To the Editor of *The Mathematical Gazette*

DEAR SIR,

If one does want to investigate d^2y/dx^2 in an example such as that given in Note 119, *The Mathematical Gazette*, December 1964, p. 426, it is surely quicker to multiply by $(x - 2)^2$ first. Differentiating

$$(x - 2)^2 y = x^3 - 3x + 2$$

twice: (ignoring the dy/dx term which will be zero for the points under consideration)

$$(x - 2)^2 \frac{d^2y}{dx^2} + 2y = 6x.$$

Thus d^2y/dx^2 has the same sign as $6x - 2y$.

Yours faithfully, A. P. HAYNES

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