n has at most 84 digits. (Hint: it pays to rewrite the inequality as $(10/9)^r \leq 90r$).

This gives $s \leq 9r \leq (9)(84)=756$; $p \leq n < 10^{85}$.

Now p being a product of digits must be of the form $2^a3^b5^c7^d$. However from our knowledge of divisibility by 10, p cannot be divisible by 10 as otherwise 10 would also divide $n(=sp)$ in which case n would end in 0 whereby the product of its digits $p = 0$ which is ruled out. Thus p can be either of the form $2^a3^b7^c$ or $3^a5^b7^c$. This certainly reduced the search space for sum-product numbers and allowed Wilson to verify the needful (for details, see [1]).

Suggested Reading

[1] Eric W Weisstein, *Sum-Product Number*, From Mathworld (http://www.mathworld.wolfram.com/Sum-Product Number.html)

Errata

***Resonance*, Vol.10, No.12, pp.67–70, 2007.**

Classroom:
Root Test and Ratio Test in the Context of (C, k) Summability of Series by P N Natarajan

$k \geq 0$ should read as $k > 0$ in the following lines :

Page 67: line 5 from top;
Page 68: line 5 from bottom;
Page 69: line 2 & line 3 from top;
Page 70: line 8 from top & line 6 from bottom

$k > -1$ should read as $0 > k > -1$ in the following lines:

Page 69: line 7 from bottom;
Page 70: line 3 from bottom.