

SOLUTION TO CROSS-NUMBER PUZZLE

The solution to the cross-number puzzle given in Vol. 14 No. 1 is

			a 1	b 9
	c 1	6	0	0
d 1	0		e 8	0
	f 6	4		
			g 2	7
h 2		i 1	0	

P. Crump gave the following proof:

From (g) down, $\sqrt{(f)}$ across is rational, also (f) across is a cube, and $10 \leq (f) \text{ across} \leq 99$, so (f) across = 64.

From (e) across, $10 \leq 8 \times (d) \text{ across} \leq 99$, and (d) across is an integer, so $2 \leq (d) \text{ across} \leq 12$.

But $10 \leq (d) \text{ across} \leq 99$, so (d) across = 10, 11, or 12.

(g) across is a 2-digit cube, so = 27 or 64. Suppose (g) across is 64. Then (b) down gives $16 \times ((d) \text{ across})^2 \leq 999$, clearly inconsistent with (d) across = 10, 11 or 12.

So (g) across = 27, (b) down gives $9 \times ((d) \text{ across})^2 \leq 999$,

so (d) across = 10, (b) down = 900.

From (g) down,

$$20 \leq (a) \text{ across} + 9 - 8 \leq 29$$

$$19 \leq (a) \text{ across} \leq 28$$

but (a) across is prime, ends in 9,

so (a) across = 19, (g) down = 20.

From (d) across, (h) across = 2,

so (i) across = 10, (e) across = 80, (a) down = 108, (c) across = 1600, (c) down = 1064.

Correct solutions were received also from S.S. Wadhwa, J. Taylor, and of course the proposer, A. Lenart.