$17 \cdot 17 = 289$

12 per cell:

3468 multiplic
if brute force

$33^4 \geq 56 \text{ millions}$

$20 \cdot 20 = 400$

$\rightarrow : ((5 + 4 \cdot 9) \cdot 20) \cdot 4 = 1680$

$\rightarrow : 1680$

$\downarrow : (17 \cdot 17) \cdot 4 = 1156$

$\searrow : (17 \cdot 17) \cdot 4 = 1156$

$\underline{5660 \text{ multiplies}}$

→ Collapse first 3 rows, cols

I	IV
II	III

row, new col:
I, II, III, IV, V, VI, VII · VIII, IV · III

SE → NW:
replace each element
with largest of:
{eNNN}, e..., eNWNWNW3
& direction tag

$2^2 = 4$ $\rightarrow 0$

$2^3 = 8$ $+2$

$2^4 = 16 \rightarrow 7$ $+2$

$2^5 = 32 \rightarrow 5$ $+2$

$2^6 = 64 \rightarrow 10$ $+4$

$2^7 = 128 \rightarrow 11$ $+4$

$2^8 = 256 \rightarrow 13$ $+4$

$2^9 = 512 \rightarrow 8$ $+4$

$2^{10} = 1024 \rightarrow 7$ -1

$2^{11} = 2048 \rightarrow 14$ $+4$

$2^{12} = 4096 \leftarrow 19$ $+5$

$2^{13} = 8192 \rightarrow 20 + 1$ $+2$

$2^{14} = 16384 \rightarrow (10 + 11 + 1) = 22$ $+2$

$2^{15} = 32768 \rightarrow 26$ $+4$

$2^{1000} \rightarrow 8$

while 8 > 1
$8' = 8/10$
$r = r + (8 - 108')$
$8 = 8'$