As easy as 1-2-3
E1588 – Albert Haddad

Answer: THREE is 12744

The winner is Richard Kennaway of Norwich, UK. There were 125 entries

(2)

```
  ● ● a
  b c d
  ------
  Θ N E
T W Θ
● ● ●
-------
T H R E E
```

The sum is shown with arbitrary letters **a, b, c, d**, and O denoted by Θ. The solution is based on the association between N, Θ, E, and the multiplication **c** x **a** yielding Θ.

Given **ΘNE**, **TWΘ**, **THREE** are exactly divisible by six ∴ E and Θ are even;

From col (2) N+Θ yields E ∴N is also even, and N≠0 (Θ≠E) and leading digit Θ≠0

From the above conditions all values of **ΘNE** are shown in the table.

N=2	N=4	N=6	N=8	Remarks

∴ ΘNE = 246, 426, 684, or 864. These values are inspected in the tables where **c** x **a** yields Θ

ΘNE=246: top multipliers are 246 or 123

● ● a b c d Θ N E T W Θ	2 4 6 b c 1 2 4 6 T W 2	1 2 3 b c 2 2 4 6 T W 2
	∴c=2, T=4=N or c=6, T=14 Not OK	∴c=4, T=4=N Not OK

ΘNE = 426: top multipliers are 426, 213 or 142

● ● a b c d Θ N E T W Θ	4 2 6 b c 1 4 2 6 T W 4	2 1 3 b c 2 4 2 6 T W 4	1 4 2 b c 3 4 2 6 T W 4
	∴c=4, T=17 or c=9, T=38 Not OK	∴c=8, T=17 Not OK	∴c=2, T=2=N or c=7, T=9=W Not OK

ΘNE = 684: top multipliers are 684, 342, 288, 171 or 114

● ● a b c d Θ N E T W Θ	6 8 4 b c 1 6 8 4 T W 6	3 4 2 b c 2 6 8 4 T W 6	2 8 8 b c 3 6 8 4 T W 6	1 7 1 b c 4 6 8 4 T W 6	1 1 4 b c 6 6 8 4 T W 6
	∴c=4 or 9, ∴T>10 Not OK	∴c=3 or 8 ∴T≥10 Not OK	c=2, TWΘ=576 or c=7, T=20 Not OK	∴c=6, ∴T=10 Not OK	∴c=4, T=4=E or c=9, T=10 Not OK

ΘNE = 864: top multipliers are 864, 432, 288, 216, 144 or 108

● ● a b c d Θ N E T W Θ	8 6 4 b c 1 8 6 4 T W 8	4 3 2 b c 2 8 6 4 T W 8	2 8 8 b c 3 8 6 4 T W 8	2 1 6 b c 4 8 6 4 T W 8	1 4 4 b c 6 8 6 4 T W 8	1 0 8 b c 8 8 6 4 T W 8
	∴c=2, T=17 or c=7, T=60 Not OK	∴c=4, T=17 or c=9, T=38 Not OK	∴c=1, W=8=Θ or c=6, T=17 Not OK	∴c=3, T=6=N or c=8, T=17 Not OK	∴c=2, W=8= Θ or c=7, T=10 Not OK	∴c=1,TWΘ=108 or c=6, T=6=N Not OK

From the tables the two possible values are, ONE = 684, and ΘNE = 864, corresponding to:

ONE=684: TWΘ = 576, where T=5, ∴THREE = 5HR44 = 288 x b23 ∴b=2 ∴288 x 223 = 64224 ≠ 5HR44, Not OK

ONE=684: TWΘ = 108, where T=1, ∴THREE = 1HR44 = 108 x b18 ∴b=1 ∴108 x 118 **= 12744 = THREE** OK

Output

Θ =8
N= 6
E=4
T=1
W=0
H=2
R=7

(108x118)

∴ **ΘNE = 864; TWΘ = 108; THREE = 12744** ∴**Θ=8, N= 6, E=4, T=1, W=0, H=2, R=7** (multipliers are 108 x 118)

Answer: **THREE = 12744**

The given multiplication is confirmed numerically from unique multipliers 108 x 118, and where all letter products **ΘNE = 864, TWΘ = 108,** and **THREE = 12744,** are exactly divisible by two and three as stated

• • •	1 0 8	
• • •	1 1 8	
O N E	8 6 4	= (6 x 144)
T W O	1 0 8	= (6 x 18)
• • •	1 0 8	
T H R E E	1 2 7 4 4	= (6 x 2124)

In general, the configuration has two solutions; the other (not ÷ by 6) is 117 x 347; ONE=819, TWO=468, THREE=40599