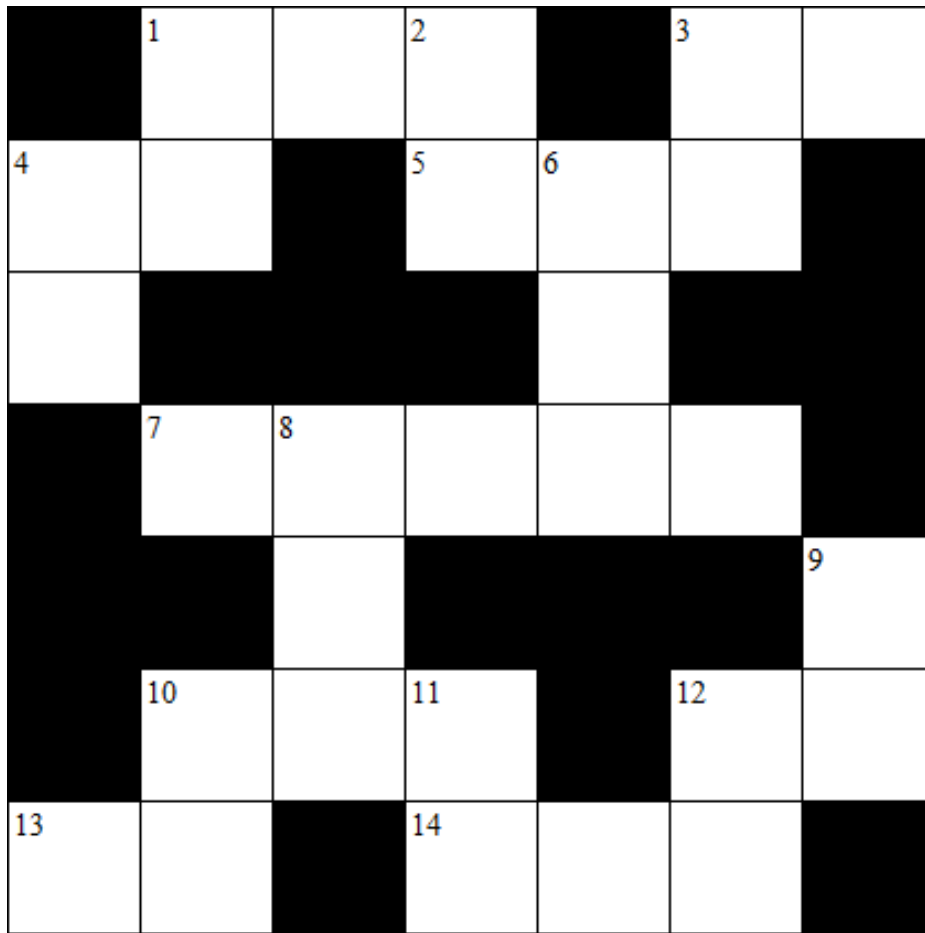


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Team Number



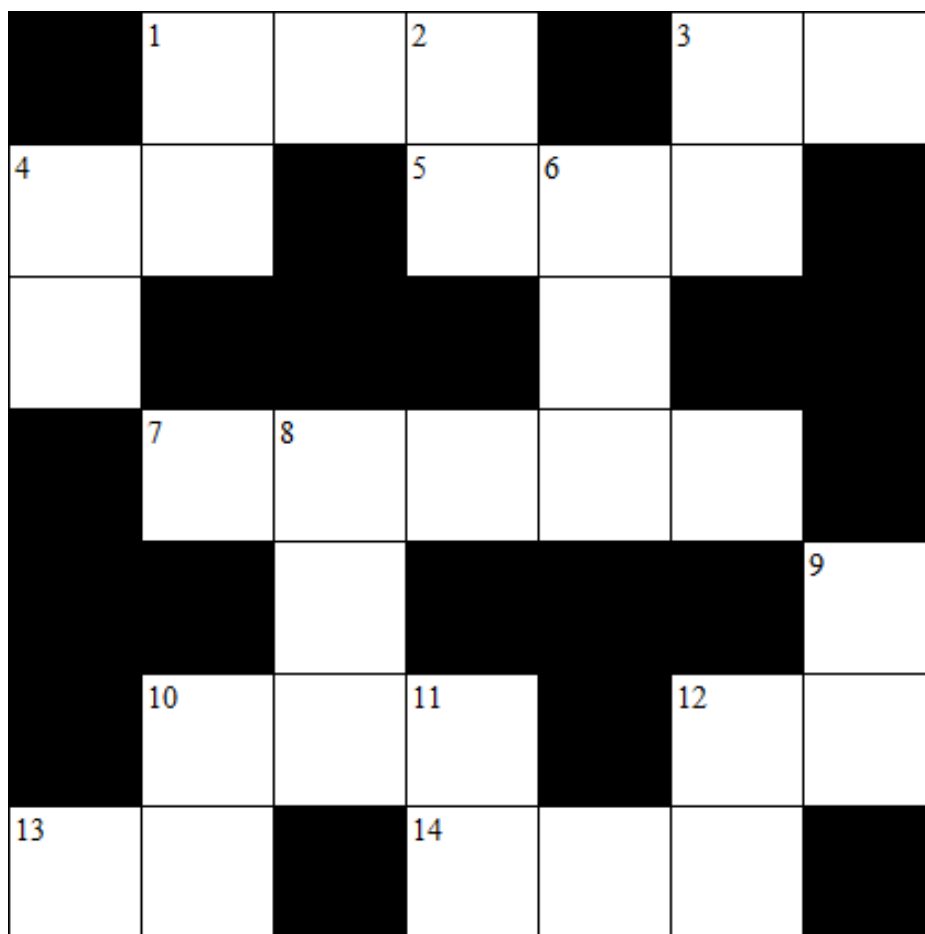
ACROSS

- The number of cyclic subgroups in the dihedral group $D_{2 \times 239}$
- The remainder of $7^{(6 \text{ DOWN})}$ when divided by 4 ACROSS
- The expected number of times that two fair dice need to be rolled before a 1 and a 6 (unordered) appear in a roll (excluding the last roll)
- A power of 3
- A palindromic number[†], the product of whose digits is 1575
- A multiple of 9
- The number of trailing zeros in $100!/50!$ when expanded out
- The largest 2-digit number with rotational symmetry (in base 10)
- $\|A\mathbf{v}\|^2$, where $A = \begin{pmatrix} -1/\sqrt{3} & 0 & 2/\sqrt{6} \\ 1/\sqrt{3} & 1/\sqrt{2} & 1/\sqrt{6} \\ -1/\sqrt{3} & 1/\sqrt{2} & -1/\sqrt{6} \end{pmatrix}$ and $\mathbf{v} = \begin{pmatrix} 5 \\ 6 \\ 7 \end{pmatrix}$

[†] A number is palindromic if it remains the same after its digits are reversed.

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DOWN

1. A perfect cube
2. The number of cyclic subgroups in the symmetric group S_4
3. A prime factor of (10 ACROSS - 3)
4. The value of y at $x = 4$, where $(dy/dx)^2 = 4y$, and $y = 0$ at $x = 0$
6. A Fibonacci number
8. $\frac{1 + 19^4 + 20^4}{1 + 19^2 + 20^2}$
9. An integer x such that $144x \equiv 22 \pmod{71}$
10. The number of subgroups in $C_2 \times C_2 \times C_2$, where C_2 is a group of order 2
11. 13 ACROSS - 3 ACROSS - 12 ACROSS - 3
12. A perfect square + 1, and a prime - 1