# Express Riddler

27 September 2019

## Riddle:

Riddler Nation's Jibriel Taha, an avid baseball fan, saw the following tweet from the Milwaukee Brewers' beat writer Adam McCalvy:

> The Brewers are...
>
> 5-5 last 10g
> 10-10 last 20g
> 15-15 last 30g
> 20-20 last 40g
> 25-25 last 50g
> 30-30 last 60g
>
> — Adam McCalvy (@AdamMcCalvy) September 6, 2019

Inspired by the Brewers' apparent mediocrity (they've since gone on a roll to clinch a playoff spot) Jibriel asks the following:

If a baseball team is truly .500, meaning it has a 50 percent chance of winning each game, what's the probability that it has won two of its last four games and four of its last eight games?

## Solution:

With eight games, there are $2^8 = 256$ possible outcomes, and each occurs with equal probability. The best way to calculate the solution is to consider the first four games and last four games separately. For each set of four games, there are $\binom{4}{2} = 6$ ways to win exactly two games, in any order. Since the two sets of four games are independent, there are $6 \times 6 = 36$ ways to win two games in each set. So the solution is $^{36}/_{256}$, or $\boxed{\mathbf{14.0625\%}}$.