

## A Sermon on Calculating Odds

Sermon by Rev. Minister Angela Smith of COPE for February 13th, 2022 (and beyond)

This sermon is inspired in part by the film “Pi” by Darren Aronofsky released in 1998. It is also a callback to the January 23<sup>rd</sup>, 2022 sermon available at <https://www.cope.church/bingosermon.pdf> . For the purposes of this sermon, I'll be calculating the overall odds of winning any Power Ball prize in the multi-state Power Ball lottery/drawings in the USA. First, let's take a look at the prize categories:

The screenshot shows the Washington's Lottery Powerball website. The page displays various prize categories with their corresponding amounts. The categories are listed on the left, and the amounts are listed on the right. The categories are: 5 White + 1 Power Ball (Excluded), 5 White + 0 Power Ball (\$2,000,000), 4 White + 1 Power Ball (\$500,000, \$250,000, \$200,000, \$150,000, \$100,000), 4 White + 0 Power Ball (\$1,000, \$500, \$400, \$300, \$200), 3 White + 1 Power Ball (\$1,000, \$500, \$400, \$300, \$200), 3 White + 0 Power Ball (\$70, \$35, \$28, \$21, \$14), 2 White + 1 Power Ball (\$70, \$35, \$28, \$21, \$14), 1 White + 1 Power Ball (\$40, \$20, \$16, \$12, \$8), and 0 White + 1 Power Ball (\$40, \$20, \$16, \$12, \$8). The website also includes a cookie consent banner and a taskbar at the bottom.

Prize Category	Prize Amount
5 White + 1 Power Ball	Excluded
5 White + 0 Power Ball	\$2,000,000
4 White + 1 Power Ball	\$500,000, \$250,000, \$200,000, \$150,000, \$100,000
4 White + 0 Power Ball	\$1,000, \$500, \$400, \$300, \$200
3 White + 1 Power Ball	\$1,000, \$500, \$400, \$300, \$200
3 White + 0 Power Ball	\$70, \$35, \$28, \$21, \$14
2 White + 1 Power Ball	\$70, \$35, \$28, \$21, \$14
1 White + 1 Power Ball	\$40, \$20, \$16, \$12, \$8
0 White + 1 Power Ball	\$40, \$20, \$16, \$12, \$8

Power Ball Match = Prize (Odds of Matching Power Ball are 1 in 26)

1 White Ball = No Prize w/o Power Ball Match (Odds of Matching the 1st White Ball are 1 in 69)

2 White Balls = No Prize w/o Power Ball Match (Odds of Matching 2nd White Ball are 1 in 68)

3 White Balls = Prize (Odds of Matching the 3rd White Ball are 1 in 67)

3 White Balls + Power Ball = Prize

4 White Balls = Prize (Odds of Matching the 4<sup>th</sup> White Ball are 1 in 66)

4 White Balls + Power Ball = Prize

5 White Balls = Prize (Odds of Matching the 5th White Ball are 1 in 65)

5 White Balls + Power Ball = Jackpot

The thing is though, with Power Ball you don't win anything with just one or two white balls and no Power Ball. You have to match the Power Ball for the first three prize categories which means the odds of winning anything from those categories is minimally 1 in 26. But, it does appear the game itself claims the odds of winning any prize overall are 1 in 24.9. This appears to be a result of counting the odds of which multiplier may come up with the PowerPlay option rather than based on the actual odds of matching the ball numbers alone when determining odds of winning any prize. This is why I find the odds as stated on the play slip misleading.

The actual odds of matching the Power Ball are 1 in 26 and the actual overall odds of matching any white ball(s) are 1 in 67. The actual odds of matching the Mega Ball (in Mega Millions) are 1 in 25 and the actual overall odds of matching any white ball(s) are 1 in 68. With both games, if you add the odds of matching both the special ball and the white ball you get 93 which when divided by 2 gives you an average of 46.5 therefore 1 in 46.5 constitutes the overall odds of winning any prize on either game. The odds on both games are close but not the same for matching the special ball, 1 in 25 is slightly better odds than 1 in 26, but with Mega the white balls are numbered 1-70 and with Power Ball the white balls are numbered 1-69. If you add  $69+68+67+66+65$ , you get 335 and you divide that by 5 to get the 1 in 67 for the odds of matching any white ball(s) in Power Ball. If you add  $70+69+68+67+66$ , you get 340 and you divide that by 5 (number of white balls drawn in any single drawing) to get 1 in 68.

The odds don't change because of the limited number of balls potentially to be drawn in any given drawing. The history of the drawings does not determine the outcome of future drawings in terms of what numbers are likely to be drawn. All are always equally likely to be drawn or not drawn in any given drawing. The overall odds of winning any Power Ball prize remain 1 in 46.5. In other words, each panel/set of numbers played in any given drawing has a 2.15% chance of winning any prize and a 97.85% chance of winning nothing at all. The same percentile odds apply to Mega Millions. [Meditative/Potential Poll Question: Would you buy an umbrella if there were a 2.15% chance of rain?]

Do you think the odds of playing the state Lotto are any better? In Washington State, here are the odds:

Odds of Matching First Ball Drawn In Any Drawing: 1 in 49

Odds of Matching Second Ball Drawn In Any Drawing: 1 in 48

Odds of Matching Third Ball Drawn In Any Drawing: 1 in 47

Odds of Matching Fourth Ball Drawn In Any Drawing: 1 in 46

Odds of Matching Fifth Ball Drawn In Any Drawing: 1 in 45

Odds of Matching Sixth Ball Drawn In Any Drawing: 1 in 44

Overall Odds of Matching Any Ball: 1 in 46.5

Same calculation (add 49+48+47+46+45+44=279 then divide by 6) was applied to get the overall odds. Now, with each Lotto ticket you get two sets of six numbers for \$1. But, each set has a 1 in 46.5 chance of matching one ball and with two sets of completely different numbers in each set, you'd have a 1 in 23.25 chance of matching one number. The odds of matching the Mega Ball in Mega Millions are 1 in 25 and it is a prize category. The odds of matching the Power Ball in Power Ball are 1 in 26 and it is a prize category. Matching one number on Lotto is not a prize category. You have to match 3 to win anything. In other words, you have an overall chance of matching any number in Lotto of 2.15% (per 6 number set) and an overall chance of winning a prize on Mega Millions and Power Ball of 2.15%, with a 3.846% chance of matching the Power Ball (a prize category) and a 4% chance of matching the Mega Ball (a prize category). The odds of winning a prize in Mega or Power Ball are better than winning a prize in the state Lotto at least in WA State where the Lotto number options are 1-49. Odds of winning any prize on a scratch ticket in WA State are on average 1 in 5 or a 20% chance of winning something with an 80% chance of winning nothing. Source: <https://walottery.com/Scratch/PrizeOdds.aspx#:~:text=The%20average%20chance%20of%20winning,within%20every%20five%20consecutive%20tickets>.

I hope I've exhibited reasonableness in explaining my thinking here while also recognizing that even though I think I'm on to something I may be incorrect. Either way, in moderation and just for fun, play with my blessing and pray the government uses the money wisely.

In addition, when asked if the overall odds of winning are correct for Power Ball drawings, they say this: Source: <https://www.powerball.com/index.php/faq/question/are-you-sure-odds-are-correct>

COPE MINISTRIES (@heal247) / T x Are you sure the odds are correct x +

powerball.com/index.php/faq/question/are-you-sure-odds-are-correct

POWERBALL POWERPLAY Games More Play Responsibly Winning Numbers

Most players think the odds of matching the Powerball to win a prize are 1 in 26, since the Powerball is drawn from a field of numbers from 1 to 26.

But consider this...

The odds of matching the Powerball ALONE are harder than 1 in 26, because there is also the chance you could match one or more white balls, in addition to the Powerball, to win another prize.

Powerball numbers are drawn from two sets of numbers, so the odds of winning a prize are calculated by combining the odds for **both** sets of numbers for all prize levels. The odds for matching just the Powerball are calculated by combining the odds of **selecting** the Powerball **and** the odds of **not selecting** any of the five numbers from the first set of numbers drawn.

Category  
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The objective way to see the Power Ball numbers is to be impartial and recognize each number as equally likely to be chosen or drawn during any scheduled drawing. Perhaps find it comforting that any are ever chosen at all and know every drawing somebody wins something even though there are no guarantees anyone will win anything. The subjective way is to be partial to your own set, which can lead to disappointment in your own numbers over time if they are rarely or never chosen/drawn. The hypocrite will blame the game or the numbers themselves while the fool will continue to believe in superstitious luck while likely arguing the fact they haven't been drawn is reason to believe they are more likely to be drawn in the future. The overall likelihood of matching any white ball remains 1 in 67 and the overall likelihood of matching the Power Ball remains 1 in 26 per panel. Those odds do not change because the limited set of possible ball numbers do not change nor do the number of balls drawn.

If you are particularly emotionally or otherwise dependent on how the Power Ball drawings turn out because you believe your numbers are special so are partial to them, you are failing to recognize the equality of all the balls therefore may inadvertently be practicing inequality if not consciously aware of it. The balls are equal and have the same purpose in terms of Power Ball drawings. Respect the balls, respect equality.

For those interested in starting #TaoFu Self-Defense Exercises, please see <https://www.cope.church/taofu.htm> and begin at any time.

There are opportunities to send messages, receive mystery bonus blessings, and more with or without donating available now on our "Pass the Basket" page at <https://www.cope.church/basket.htm> . Thank You.

"And ye shall know the truth, and the truth shall make you free." John 8:32 KJV Willful blindness is an abomination.

COPE accepts Feedback, critical and complimentary. Learn more at <https://www.cope.church/feedback.htm> . For the sake of keeping myself and others humble, a sense of humor is welcome on all sides.

For More About COPE and the HEAL Mission, see:

<https://www.cope.church> and <https://www.heal-online.org>