

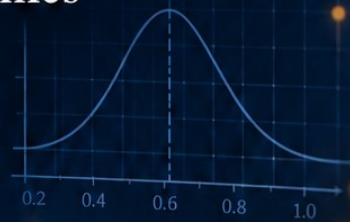
# THE SECRET LOTTERY CODE

$$P(A) = \frac{m}{n}$$

$$nC_k = \frac{n!}{k!(n-k)!}$$

The Hidden Mathematics,  
Probability, and Smart Strategies  
Behind Lottery Games

$$\sum_{i=1}^n P(i)$$



DONALD CORN

# Copyright and Disclaimer

© Copyright 2026 StargateDPN Publishing. All rights reserved.

The contents of this book may not be reproduced, duplicated, or transmitted without direct written permission from the author or the publisher.

Under no circumstances will any legal responsibility or blame be held against the publisher or author for any reparation, damages, or monetary loss due to the information contained within this book, either directly or indirectly.

This book is copyright-protected. It is only for personal use. You cannot amend, distribute, sell, use, quote, or paraphrase any part of the content within this book without the author's consent.

## **A note to readers**

This book teaches probability and decision-making. It does not offer winning-number predictions, guaranteed profits or a method to defeat a fair random lottery. It is intended for adults of legal playing age.

Examples are educational; actual purchases and claims are governed by official local rules.

First edition manuscript • October 2026

# Contents

Introduction

- 1 The secret behind the dream
- 2 The secret of counting the possibilities
- 3 Why yesterday cannot choose tomorrow
- 4 The secret behind misleading patterns
- 5 More tickets and the meaning of improvement
- 6 The secret of expected value
- 7 Choosing games with a fixed budget
- 8 Pools and wheeling systems
- 9 Sharing a jackpot and choosing numbers
- 10 AI predictions and expensive promises
- 11 The spending plan that works without a win

12 If a ticket wins

Conclusion What the secret code really unlocks

Workbook Put the mathematics to use

Glossary

Sources and calculation notes

# Introduction

A lottery ticket sells two things: a chance at a prize and permission to imagine a different life. The imagination is easy to understand. The chance deserves a closer look.

You may have opened this book hoping for a pattern that turns ordinary numbers into winning numbers. Here is the promise this book can keep: by the final page, you will understand how the games work, what a strategy can change, and which claims should never earn your money. No method in these pages predicts the next fair random drawing. There is no evidence-based shortcut from yesterday's results to tomorrow's jackpot.

The secret in this title is the mathematical structure beneath the game: combinations, independent events, prize schedules, shared jackpots and the price paid for a chance. These ideas can feel hidden behind advertising and winner stories, but they are available for anyone to

learn. Understanding them can prevent expensive mistakes and make occasional play more deliberate and enjoyable.

This is a book for adults who want clear explanations rather than technical intimidation. The examples begin with small imaginary games before moving to familiar American lotteries. Invented examples are labeled as such. Named-game rules were checked on October 19, 2026, and may change. Your purchasing jurisdiction's official rules govern actual play and claims.

Read with a pencil. Calculate a cost before buying a ticket. Question a percentage before trusting it. Most of all, distinguish a possible event from a probable one. A jackpot can happen to someone while remaining extraordinarily unlikely for you.

You do not need to purchase a ticket to benefit from this book.

Learning when to keep your money is one of its most useful outcomes.

# 1 The secret behind the dream

*The secret to reading a lottery claim is to separate the winner's outcome from the odds faced by every buyer.*

Imagine a transparent drum holding ten numbered balls. You choose one number and one ball is drawn fairly. Your chance of matching is one in ten, or 10 percent. Choosing your birthday changes the personal meaning of the ticket. It does not change the drum.

Now suppose a ticket costs \$2 and a match pays \$10 in total. Across ten equally likely outcomes, one returns \$10 and nine return nothing. The average payout is \$1 per ticket. Subtract the \$2 purchase price and the expected net result is a loss of \$1. A winner still receives a real prize.

The average buyer still faces an unfavorable game.

This distinction explains how a lottery can produce spectacular winners without being a dependable source of income. The winner's story is an account of an outcome. The odds describe the process that produced all outcomes, including the quiet losses.

Three questions should come before every purchase. What is the chance of any prize? What is the chance of finishing ahead? What is the chance of the particular prize you want? These are different questions. If a \$5 ticket returns \$5, it may count as a winning ticket in the prize schedule, but the player has earned no net profit.

A fourth question concerns the price of participation. A slightly better jackpot probability can accompany a much higher ticket price.

Comparing odds alone ignores what the same dollar can buy. Later chapters show how to compare equal budgets without treating either purchase as an investment.

A useful practice is to describe a ticket in one sentence before buying it: "I am paying this amount for this chance under these rules." If the sentence instead becomes "I need this to solve my money problem," pause. Financial need does not influence a random selection.

The emotional appeal is not a mathematical error by itself. People pay for films and games knowing they will not recover the admission price. The problem begins when entertainment spending is mistaken for an

income plan. Decide which kind of purchase you are making before the dream takes over.

## 2 The secret of counting the possibilities

*The secret of the bonus ball is multiplication: a separate pool expands the number of complete outcomes.*

The central lottery calculation counts complete outcomes. In an imaginary game, choose three different numbers from ten. The order does not matter: 2, 5, 9 is the same set as 9, 2, 5.

There are ten choices for the first number, nine for the second and eight for the third. Multiplying gives 720 ordered selections. But each three-number set has six arrangements: three choices for the first position, two for the second and one for the last. Divide 720 by six to get 120 distinct sets. One ticket covers one of those 120 outcomes.

Mathematicians write this as  $C(10,3)$ . The general formula is  $C(n,k) = n! / [k! \times (n-k)!]$ . The exclamation mark means factorial: multiply the positive whole numbers down to one. You need not memorize the notation. Remember the procedure: count selections, then remove the repeated arrangements when order is irrelevant.

If a separate bonus ball comes from a different pool, multiply the number of main-number sets by the number of bonus choices. Our imaginary three-from-ten game with a bonus ball from five has  $120 \times 5 = 600$  complete outcomes. Matching everything has probability one in 600.

Under the Powerball format checked for this book, a play selects five numbers from 69 and one separate Powerball from 26.  $C(69,5)$  equals 11,238,513. Multiply by 26 and the result is 292,201,338. That is why a single play's jackpot probability is one in 292,201,338. [1, 3]

Mega Millions uses five main numbers from 70 and one Mega Ball from 24.  $C(70,5)$  equals 12,103,014. Multiply by 24 to get 290,472,336. A single play therefore has jackpot odds of one in 290,472,336 under this format. [2]

The bonus pool is separate. The same numerical value can appear as a main number and as the bonus ball when the rules allow it; those are different selections from different pools.

Notice how quickly a simple-looking ticket becomes a huge counting problem. A person sees six printed numbers. Mathematics sees hundreds of millions of possible complete results. That difference in scale is the first important part of the code.

### 3 Why yesterday cannot choose tomorrow

*The secret of independence is that a fresh drawing starts without a debt to yesterday's numbers.*

A fair drawing does not remember the previous drawing. If a particular number appeared last time, the equipment does not owe the other numbers a turn. If a number has been absent for weeks, its absence does not accumulate into a debt.

Consider a fair coin that has landed heads five times. The probability of that five-flip history was one in 32 before the flips happened. Once the history has occurred, the next flip still has a one-half chance of heads. Confusing those two perspectives creates the gambler's fallacy: treating a random process as though it must immediately correct its recent imbalance.

The opposite story is equally tempting. A number appears several times and becomes "hot." A seller presents its recent frequency as proof of momentum. In an independent fair draw, recent appearances

do not create momentum either. Both the overdue story and the hot-number story add a memory the process does not possess.

Randomness also produces clusters. If you scatter points randomly across a page, some land close together. A perfectly even pattern would itself be unusual. Number histories likewise contain streaks, gaps and coincidences without implying a usable forecast.

Does this mean historical data is worthless? No. It can check record accuracy, teach probability and help investigate a specific concern about fairness. But detecting a genuine irregularity requires careful statistical work, reliable data and independent validation. A chart with red circles around several coincidences does not establish one.

The strongest test of a prediction is a prediction recorded before the drawing, evaluated on future drawings under rules chosen in advance. Trying dozens of patterns and announcing only the successful one produces a misleading appearance of skill. The discarded failures belong in the evidence.

Exercise: write down one claim you have heard about lucky or overdue numbers. Ask what evidence would show the claim to be wrong. If the answer is “nothing,” you are looking at a belief or a sales pitch, not a testable method.

## 4 The secret behind misleading patterns

*The secret behind a convincing pattern is often the number of outcomes it groups together, not a privileged ticket.*

Which set feels more plausible: 1, 2, 3, 4, 5, or 8, 19, 34, 47, 62? In a fair five-number drawing from the same pool, each exact set has the same probability. The first looks designed. The second looks accidental. The drawing mechanism does not recognize that distinction.

There are, however, many more sets that look mixed than sets that form five consecutive numbers. This is a difference between a category and an individual outcome. “Some mixed set will occur” covers a large collection of results. “This particular mixed set will occur” covers only one.

The same issue appears in odd-even charts. A category such as two odd and three even numbers includes numerous combinations. It can occur more frequently than an extreme category while every specific set within either category remains equally likely. Buying one balanced

set does not give that set the probability of the entire balanced category.

Number sums invite a similar mistake. Middle sums can be produced by many sets, while the smallest possible sum has only one set.

Knowing that middle sums are common does not identify which of the many middle-sum tickets will be drawn. A filter can narrow your selections while also eliminating possible winners.

Winners' stories encourage another confusion. Someone remembers a dream, chooses its numbers and wins. The story leaves out the many people who dreamed, chose numbers and lost. To evaluate the method, you need both groups and the amounts spent. A memorable success is not a complete denominator.

A player may enjoy birthdays, symmetrical patterns or a favorite number. Enjoyment is a valid reason for an entertainment choice. It is not evidence of superior probability.

When evaluating a chart, ask: does this statistic describe one exact ticket or an entire class of tickets? Then ask: how many tickets would I

have to buy to cover that class? Those questions turn a persuasive picture back into a counting problem.

## 5 More tickets and the meaning of improvement

*The secret of improved coverage is simple: count distinct combinations and include their full cost.*

In a drawing with  $N$  equally likely jackpot outcomes, buying  $m$  distinct complete combinations gives jackpot probability  $m/N$ , provided  $m$  does not exceed  $N$ . Ten distinct tickets cover ten outcomes. One ticket printed ten times still covers only one outcome, although duplicate winning tickets may affect the amount paid under the prize rules.

For Powerball's 292,201,338 possible complete outcomes, ten distinct plays give a jackpot chance of ten in 292,201,338, or about one in 29.2 million. That is ten times the chance of one play and still extremely unlikely. A large relative improvement can leave a tiny absolute probability.

At a \$2 base price, those ten plays cost \$20, before optional additions or jurisdictional purchase requirements. The improvement is purchased

by spending ten times as much. It is coverage, not a discovery about which numbers are favored. [1]

Repeated drawings require a different formula. If one independent attempt has success probability  $p$ , the probability of at least one success in  $d$  attempts is  $1 - (1-p)^d$ . Multiplying  $d$  by  $p$  is a useful approximation only when the resulting probability is small.

In an imaginary game with a one-in-100 chance per independent attempt, 100 attempts do not guarantee success. The chance of at least one success is about 63.4 percent. There is still about a 36.6 percent chance of no successes. “One in 100” is not a schedule promising a win on attempt 100.

Buying every distinct combination in a single drawing would cover its jackpot outcome, but that observation is not a practical profit strategy. The purchase bill can be enormous. Sales deadlines, processing limits, duplicates, cash value, shared prizes and applicable rules all matter. A covered jackpot outcome is not the same as a guaranteed positive net return.

Before increasing ticket volume, write the extra cost beside the absolute probability. If a seller says a system improves your odds fiftyfold, ask whether it simply requires fifty tickets. The arithmetic may be correct while the sales impression is misleading.

## 6 The secret of expected value

*The secret of expected value is to count every payout and every cost, including the outcomes a sales pitch leaves out.*

Expected value combines every possible payout with its probability.

For a ticket with mutually exclusive prize outcomes, expected payout equals the sum of each prize multiplied by its probability. Expected net value subtracts the ticket cost. Use total prize payments consistently; do not accidentally count a returned stake twice.

Consider an invented \$2 ticket. It pays \$100 with probability one in 200, pays \$5 with probability one in ten, and otherwise pays nothing.

Assume those prize categories cannot overlap. The expected payout is  $(\$100 \times 1/200) + (\$5 \times 1/10)$ , or \$1. The expected net result is \$1 minus \$2: a loss of \$1 per ticket.

This does not mean each player loses exactly \$1. Most lose \$2, some receive \$5 and a few receive \$100. Expected value is a probability-

weighted average, not the most common result and not a promise about your next purchase.

Large advertised jackpots complicate the calculation. An advertised annuity total is not the same amount as today's cash option. If several jackpot-winning tickets exist, the jackpot is shared according to the rules. To estimate your jackpot contribution accurately, you must account for the distribution of other winning tickets, not assume the whole advertised prize belongs to you.

For a simplified model, let  $p$  be your jackpot probability and  $V$  be the appropriate expected cash share conditional on your ticket winning. The jackpot's expected contribution is  $p \times V$ . Add the expected non-jackpot payouts and subtract the price. Any after-tax version needs applicable tax treatment as well. Do not mix a pretax jackpot with after-tax smaller prizes.

A hypothetical positive expected value would still not create a reliable income stream. Rare-event returns can be dominated by a prize you

never receive. Capital limits and the risk of losing the entire playing budget remain relevant. Averages alone do not pay next month's bills.

The practical use of expected value is comparison and skepticism.

When someone presents a "profitable jackpot," ask which cash value, sharing assumptions, prize rules and costs went into the calculation.

Without those inputs, the answer is incomplete.

## 7 Choosing games with a fixed budget

*The secret of a fair comparison is to hold the budget constant and state which kind of success you are measuring.*

Begin with a budget you are prepared to spend entirely on entertainment. Then compare what that amount purchases. Do not begin with the jackpot you wish you could afford to chase.

Powerball's base play is \$2, although some jurisdictions bundle an additional feature. Mega Millions is \$5 per play with an included multiplier under the rules checked for this edition. Their jackpot probabilities are close, but their prices are different. [1, 2]

In a jurisdiction allowing the \$2 base Powerball purchase, a \$10 budget buys five distinct base plays. The jackpot probability is  $5/292,201,338$ .

The same budget buys two distinct Mega Millions plays, with probability  $2/290,472,336$ . On jackpot probability alone, the first purchase covers about 2.49 times as much chance. This says nothing by

itself about expected payout: actual jackpots and non-jackpot prizes differ.

A multiplier can increase eligible non-jackpot payouts without improving the chance of matching the jackpot combination.

Powerball's Power Play is such an addition; Mega Millions includes its multiplier in the ticket price. Read what is multiplied, when, and whether a prize tier has a special rule. [1, 2]

Smaller local games can offer more attainable top-prize probabilities and smaller top prizes. That is a tradeoff, not a universal recommendation. Compare official ticket price, prize schedule, probability of profit and game structure. A lower jackpot denominator does not automatically produce better expected value.

For scratch tickets, distinguish odds printed for the original game from the probability attached to a ticket currently available for sale. A list of remaining prizes is incomplete without reliable information about the remaining ticket inventory and distribution. A game with an unclaimed top prize does not tell you where its winning ticket is.

Build a comparison with five entries: purchase price, jackpot probability, any-prize probability, prize amounts and your maximum spend. Add cash value and sharing assumptions if estimating expected return. If the information is missing, mark it unknown rather than filling the gap with optimism.

## 8 Pools and wheeling systems

*The secret behind a pool or wheel is organized coverage, with sharing or conditions that must be understood.*

A lottery pool combines purchases and divides eligible winnings. If ten people each contribute \$2 and buy ten distinct \$2 plays, the group covers ten combinations. Each equal member holds one-tenth of the group's payout under the agreement.

Under a simplified fixed-prize model, each member's expected share equals the expected value of the amount that member contributed. The pool exchanges a larger chance of receiving a smaller share for a smaller chance of receiving a full prize. It does not multiply wealth by multiplying participants.

The real benefit can be social: a group enjoys the drawing together.

The real danger can be administrative: missing payments, disputed ownership, unrecorded tickets or unclear rules. Agree on contributions, shares, covered drawings, purchase deadlines, ticket

custody, copies and treatment of small prizes before buying.

Distinguish the organizer's personal tickets from pool tickets. A local professional can help with substantial agreements and claims.

A wheeling system organizes combinations from a selected group of numbers. Suppose a fictional game draws three numbers and you select a pool of five favorites. A full wheel buys every three-number combination from those five:  $C(5,3)$ , or ten tickets. It covers every possible drawn triple entirely contained in your selected five.

That final condition is decisive. If the winning triple contains a number outside your five, your full wheel cannot match all three. The wheel has not persuaded the drawing to stay inside your selection. It has systematically covered ten outcomes at the cost of ten tickets.

An abbreviated wheel buys fewer combinations. Its advertised guarantee may depend on how many winning numbers fall within your selected pool and on exactly how the design is constructed. Read the condition literally. "Guaranteed if" is not an unconditional guarantee.

Ask any system seller for the exact list of tickets, the total price and the outcomes covered. Compare its jackpot coverage with the same number of distinct tickets chosen without a special system. If coverage is the same, any claimed jackpot advantage needs evidence beyond the arrangement's name.

## 9 Sharing a jackpot and choosing numbers

*The secret of number selection is to distinguish a ticket's chance of winning from the possibility of sharing its prize.*

All valid complete combinations are equally likely in a fair drawing.

They may not be equally popular with other players. These are separate properties: drawing probability and human selection behavior.

If many people choose the same combination and it wins, more winning tickets can share the jackpot. Choosing a less popular combination could reduce sharing conditional on winning if you truly know which combinations are less popular. It cannot make the drawing select your ticket more often.

Birthdays offer a plausible mechanism: people using calendar dates concentrate main-number selections within 1 through 31. But estimating the value of avoiding that range requires actual selection

data, including automated picks. You should not attach a precise profit improvement to a guess about other people's habits.

A fair random selection method is convenient because it avoids spending hours on unsupported pattern analysis. Selecting numbers manually is also fine if you enjoy it. Neither method has a built-in advantage for the probability of one valid complete combination matching the draw.

Within a single drawing, avoiding accidental duplicate combinations increases unique jackpot coverage for a fixed number of plays. Across different drawings, reusing a favorite combination is not mathematically punished. Each fresh independent drawing gives that combination its usual chance.

Do not confuse less popular with more likely. A seller may correctly explain prize splitting and then slide into claiming improved winning odds. Keep the two statements separate. Number choice may affect how many people share your success; it does not unlock advance knowledge of the outcome.

## 10 AI predictions and expensive promises

*The secret to evaluating an AI prediction is evidence from future results, not confident language.*

A computer can calculate odds, check arithmetic, summarize rules and simulate imaginary games. It can also generate confident explanations for patterns that have no predictive power. Fluency is not evidence.

A language model given past lottery results may produce a plausible list of next numbers. In a fair independent drawing, that list has no demonstrated predictive advantage just because software created it. The model's ability to recognize language patterns does not grant access to future physical randomness.

Useful AI requests include: "Explain this official prize schedule," "Check my combinations calculation," and "Show the assumptions in this expected-value estimate." Provide the actual rules, verify the calculations and use official results to check tickets. An AI response is not an official ticket validator.

A simulation is useful when its assumptions are clear. It can illustrate the spread of possible losses and wins under an invented payout table. It cannot prove a strategy works if the programmer builds the alleged advantage into the simulation. Ask where the probabilities came from and whether the experiment compares equal spending.

Before buying a prediction service, ask for time-stamped forecasts, all results, total spending and performance on future data the seller did not use to construct the method. Ask whether a simple equal-budget random-selection comparison performs just as well. A screenshot of a winner proves neither consistency nor profitability.

The word “guaranteed” deserves particular attention. Does it guarantee a refund subject to conditions? A small prize after purchasing many tickets? Coverage only when certain selected numbers are drawn? A guaranteed small payout can still accompany a large net loss.

Unsolicited messages announcing a prize require independent verification. Do not use contact details supplied by the sender as your

only check. A demand for cryptocurrency, gift cards or an advance transfer to unlock a surprise prize is a serious scam signal. Consult official lottery channels and the FTC's consumer resources. [4]

Use technology to make the game easier to understand. Do not pay extra merely because a prediction has been labeled artificial intelligence.

## 11 The spending plan that works without a win

*The secret of an affordable spending plan is that it must work even when every ticket loses.*

A sound lottery spending plan must remain affordable when every ticket loses. A plan that works only after a win is a wish with a payment schedule.

Choose an entertainment allowance after essential expenses and other commitments. Zero is a valid amount. Set it for a defined period and include subscriptions, add-ons, pool contributions and prediction products. The small extras belong in the same total.

Record purchases as spending when made. Record prizes separately. If you spend \$20 and receive \$5, the net result is a \$15 loss. Calling the \$5 a win while forgetting the \$20 purchase hides the result that matters to your budget.

An illustrative \$10 weekly habit costs \$520 across 52 weeks before prizes. Doubling it to \$20 adds another \$520 a year. This calculation

does not tell anyone what to enjoy; it shows the annual price of a repeated choice. Compare that price with other uses of the money before deciding.

Decide what happens to a prize in advance. Automatically buying more tickets with every payout turns a temporary return into additional exposure. You can keep a prize, set it aside or stop playing. Winning creates no obligation to continue.

Do not increase spending to recover a loss. Earlier purchases are sunk costs: they cannot improve the next ticket's probability. Borrowing to chase losses adds a financial obligation to an already uncertain outcome.

Use a simple ledger with date, game, total spent, total received and net result. Review it at the end of the month. If you repeatedly exceed your limit, hide purchases or feel unable to stop, pause play and seek support through a trusted professional or official responsible-play resources. The useful response is practical help, not a new system.

The most dependable result available to a player is control over the amount spent. That control matters whether the next drawing produces a jackpot winner or another rollover.

## 12 If a ticket wins

*The secret to handling a prize is careful verification before irreversible decisions.*

First verify the result through the official lottery that governs the ticket. Match the game, draw date, numbers and prize tier. A photograph on social media or an automated message is not a claim decision.

Secure the original ticket and keep its details private. Follow the issuing lottery's instructions about signing, ownership and claims; pool tickets and large claims can raise special questions. Do not post an image exposing barcodes or other identifying details.

Check the claim deadline and required documents with the official lottery. Rules about anonymity, legal entities, payment elections and publicity vary by jurisdiction. Do not assume advice written for another state applies to you.

For a substantial prize, take time to obtain qualified legal, tax and financial guidance before making irreversible elections or promises.

The distinction between cash and annuity needs a careful comparison of payment timing, taxes, personal circumstances and uncertainty.

Neither option is universally best.

Powerball describes its jackpot annuity as 30 graduated payments over 29 years, while Mega Millions describes one immediate payment followed by 29 annual payments. Their cash alternatives are different from the sum of advertised future payments. Compare the current official election terms rather than the headline number alone. [1, 2]

Avoid estimating spendable wealth by subtracting one guessed tax percentage from an advertised jackpot. Withholding and final tax liability are different concepts; actual treatment depends on the claim and applicable law. Current professional advice belongs here.

Tell fewer people until you understand the process. You can decline unsolicited offers and postpone gifts, loans and investments. A real

prize does not require immediate agreement with the first person offering help.

Finally, check every legitimate prize tier, not only the jackpot. A ticket that misses the top prize can still qualify for another payment.

Verification should be complete, private and based on official rules.

## **Conclusion What the secret code really unlocks**

The lottery's mathematics does not contain a secret instruction that makes a fair drawing obey you. It contains a way to separate hope from evidence.

You now know why combinations become enormous, why independent drawings do not repay overdue numbers, and why a ticket's exact probability differs from the probability of a broad pattern. You can recognize when "better odds" merely means more spending. You can ask whether a prize calculation includes cash value, sharing and purchase cost.

A pool can change the size and frequency of your share. A wheel can organize coverage. A multiplier can change eligible payouts. A less popular combination might affect sharing. None of these gives advance knowledge of the next result.

Keep this rule close: do not let a mathematical-sounding explanation sell you a promise stronger than its evidence. Ask what changes, what stays random and what the proposal costs.

If you choose to play, make the purchase one your budget can absorb without a prize. If you choose not to play, nothing in probability says you have missed a debt the universe owed you. The drawing will proceed either way.

The most useful secret is understanding the choice before paying for it.

## Workbook Put the mathematics to use

Exercise 1. An imaginary lottery draws two different numbers from eight, in any order. How many outcomes exist? What is one ticket's chance? Work it out before reading the answer.

Answer:  $C(8,2) = 8 \times 7 / 2 = 28$ . One ticket covers one outcome, so the chance is one in 28. Adding an independent bonus ball from four multiplies the count to 112.

Exercise 2. You buy four distinct complete combinations in that 112-outcome game. What is the jackpot chance? What if you buy the same combination four times?

Answer: four distinct combinations cover  $4/112$ , or one in 28. Four duplicates cover  $1/112$ . Duplicate tickets may change a payment if that combination wins, subject to the prize rules, but do not cover additional outcomes.

Exercise 3. An invented \$3 ticket pays \$20 with probability  $1/20$  and \$100 with probability  $1/200$ . These outcomes are mutually exclusive. Find expected payout and expected net value.

Answer:  $\$20/20 + \$100/200 = \$1.50$  expected payout. Subtract \$3 for an expected net loss of \$1.50. This average is not a promised individual outcome.

Exercise 4. A game has a  $1/50$  probability of a specified prize on each independent attempt. What is the probability of at least one such prize in 50 attempts?

Answer:  $1 - (49/50)^{50}$ , approximately 63.6 percent. It is not 100 percent. A one-in-50 probability is not a guarantee after 50 attempts.

Exercise 5. A seller advertises a twentyfold jackpot improvement. The system requires twenty distinct tickets rather than one. What has been demonstrated?

Answer: twenty times as many complete outcomes are covered at twenty times the base purchase cost. No advantage in predicting the drawing has been shown.

Your personal worksheet. Write the game and official source. Record the price, complete jackpot denominator, any-prize probability, relevant prize amounts and maximum entertainment budget. Mark missing information unknown. Explain any claimed advantage in one plain sentence. If the sentence depends on numbers being due, stop and revisit Chapter 3.

Monthly review. Total all purchases and all prizes separately. Subtract purchases from prizes. Include subscriptions and add-ons in spending.

Ask whether the entertainment was worth its actual net cost and whether you stayed within the limit. The answer can guide the next month without pretending to predict it.

# Glossary

Annuity. A series of payments over time. Its advertised total is not identical to a present cash payment.

Combination. An unordered selection of items. Lottery rules determine whether order matters.

Conditional probability. The probability of an event given a stated condition. Wheel guarantees often depend on conditions.

Expected value. A probability-weighted average of outcomes. Expected net value subtracts purchase cost.

Independent events. Events for which one outcome does not change the probability of another.

Jackpot coverage. The number of distinct complete jackpot combinations represented in a purchase.

Net result. Money received minus money spent.

Pari-mutuel prize. A payout determined by an allocated prize pool and the number of eligible winning units, under the game's rules.

Probability. A number from zero to one describing the chance of an event under a model.

Variance. A measure of how widely outcomes differ from their average.

Wheel. A structured collection of combinations, sometimes with conditional matching guarantees.

## Sources and calculation notes

Rules checked October 19, 2026. Consult the issuing lottery for changes, jurisdictional exceptions, purchase conditions and claims. This book is independent and is not endorsed by any lottery operator.

[1] Multi-State Lottery Association, Powerball official website, How to Play and prize information. <https://www.powerball.com/> . Used for the number pools, base price and jurisdictional bundling, Power Play features and payment descriptions.

[2] Mega Millions, How to Play. <https://www.megamillions.com/How-to-Play.aspx> . Used for the \$5 price, included multiplier, number pools, jackpot probability, sharing rule and payment descriptions. Prize rules include jurisdictional exceptions, including California's pari-mutuel treatment.

[3] Colorado Lottery, Powerball.  
<https://www.coloradolottery.com/en/games/powerball/> . Official published jackpot odds corroborate the combinations calculation.

[4] Federal Trade Commission, consumer guidance and prize scam resources. <https://consumer.ftc.gov/> . Also see the FTC's Pass It On materials, [https://www.bulkorder.ftc.gov/sites/bulkorder.ftc.gov/files/publications/887a-pio-tearsheets-english-508\\_0.pdf](https://www.bulkorder.ftc.gov/sites/bulkorder.ftc.gov/files/publications/887a-pio-tearsheets-english-508_0.pdf) . Used for recognizing advance-payment prize scams.

All unnamed games, budgets, pools and payout examples in this book are illustrative. Combinations, probability and expected-value calculations are derived from the assumptions stated in the text. Repeated-attempt examples assume independence. Jackpot coverage examples assume valid, distinct complete combinations and equally likely outcomes.

The Powerball and Mega Millions comparison concerns jackpot probability for a \$10 base-play budget only. It is not an expected-return comparison, recommendation to purchase, or prediction. No personal tax rate, current jackpot forecast or undisclosed player-selection dataset is assumed.