

Cardforge — Activity Book

A Spark & Anvil activity book — puzzles, questions, and fun from Cardforge.

Write in the book, circle your answers, and check the Answer Key at the back.

1. Card Game Basics

Circle the correct answer

1. How many cards are in a standard deck, not counting jokers?
(A) A standard deck contains 60 cards. (B) A standard deck contains 48 cards. (C) A standard deck contains exactly 52 cards. (D) A standard deck contains 54 cards.
2. What are the four suits in a standard deck of playing cards?
(A) The four suits are hearts, stars, clubs, and moons. (B) The four suits are red, blue, green, and yellow. (C) The four suits are hearts, clovers, diamonds, and arrows. (D) The four suits are hearts, diamonds, clubs, and spades.
3. Which cards are called 'face cards' in a standard deck?
(A) Face cards are the Ace, King, and Queen in each suit. (B) Face cards are the Jack, Queen, and King in each suit. (C) Face cards are only the Kings and Queens. (D) Face cards are any cards that show a number on their face.
4. In most card games, what does the term 'hand' refer to?
(A) A hand is another name for a full round of the game. (B) A hand is the set of cards a player is currently holding. (C) A hand means the dealer's cards only. (D) A hand is the pile of cards in the center of the table.
5. What does it mean to 'deal' the cards?
(A) Dealing means distributing cards from the deck to each player. (B) Dealing means shuffling the cards before the game. (C) Dealing means counting the total number of cards. (D) Dealing means placing all cards face-up on the table.
6. What is the 'draw pile' in a card game?
(A) The draw pile is the cards in your hand that you plan to play. (B) The draw pile is a pile of cards that have already been played. (C) The draw pile is where you place your unwanted cards. (D) The draw pile is the face-down stack of cards that players draw from during the game.

Write the answer

7. In which direction do turns typically pass in most Western card games?

Answer: _____

8. How many cards of each rank (like 7s or Kings) exist in a standard 52-card deck?

Answer: _____

9. Why does the dealer role rotate between players in most card games?

Answer: _____

10. What is the difference between a 'trick-taking' game and a 'matching' game?

Answer: _____

Match each question to its answer

1. Why is shuffling important before dealing cards? →

2. In the game War, why is no strategy involved? →

3. In Go Fish, why do you ask for a specific rank you already have in your hand? →

4. What does 'discard' mean and how is it different from 'draw'? →

5. Why do Crazy Eights and Uno have similar gameplay even though they use different decks? →

(A) You ask for ranks you hold because you need matching cards to form sets, and you can only ask for ranks already in your hand.

(B) Both games share the same core mechanic — matching a card by suit or rank (or color/number) and using special cards to change gameplay.

(C) Discarding means placing an unwanted card from your hand onto the discard pile, while drawing means taking a new card into your hand.

(D) War has no strategy because players have no choices to make — they simply flip their top card each turn.

(E) Shuffling randomizes the order of cards so that no player can predict what cards they or others will receive.

2. Probability and Card Math

Circle the correct answer

11. What does 'probability' mean in mathematics?

(A) Probability means always knowing what will happen next. (B) Probability means the number of cards in your hand. (C) Probability is a number between 0 and 1 that describes how likely an event is to happen. (D) Probability is a type of card game played in casinos.

12. What is the 'sample space' when drawing a single card from a standard deck?

(A) The sample space is the number of players in the game. (B) The sample space is the 4 suits only. (C) The sample space is the 13 ranks only. (D) The sample space is the set of all 52 possible cards that could be drawn.

13. How many red cards are in a standard 52-card deck?

(A) There are 32 red cards in the deck. (B) There are 26 red cards: 13 hearts and 13 diamonds. (C) There are 20 red cards in the deck. (D) There are 13 red cards in the deck.

14. How many face cards are in a standard 52-card deck?

(A) There are 8 face cards total. (B) There are 12 face cards: 4 Jacks, 4 Queens, and 4 Kings. (C) There are 10 face cards in the deck. (D) There are 16 face cards if you count the Aces.

15. What does 'equally likely outcomes' mean when shuffling and drawing cards?

(A) It means the game will always end in a tie. (B) It means every player gets an equal number of cards. (C) It means every card in the deck has the same chance of being drawn. (D) It means you will always draw a card you need.

16. What is a 'favorable outcome' in probability?

(A) A favorable outcome is any outcome that matches the event you are calculating the probability for. (B) A favorable outcome means drawing the highest card. (C) A favorable outcome is when you win the game. (D) A favorable outcome is any card that is red.

Write the answer

17. Why is the probability of drawing a heart from a full deck written as $\frac{13}{52}$ or $\frac{1}{4}$?

Answer: _____

18. Explain why the probability of drawing a specific card (like the Ace of Spades) is much lower than drawing any Ace.

Answer: _____

19. What is the difference between theoretical probability and experimental probability in card games?

Answer: _____

20. Why does drawing a card and then putting it back before drawing again produce different probabilities than drawing two cards without putting the first one back?

Answer: _____

Match each question to its answer

1. If you know that the probability of drawing a club is $1/4$, what is the probability of NOT drawing a club? →
2. How does a tree diagram help you think about drawing two cards in a row? →
3. Why is shuffling a deck described as creating 'random' outcomes, and what does random really mean? →
4. What is the probability of drawing a face card (Jack, Queen, or King) from a full 52-card deck? →
5. You draw one card from a shuffled deck. What is the probability of drawing either a heart or a diamond? →

- (A) The probability is $12/52$, which simplifies to $3/13$, or about 23%.
 - (B) The probability is $26/52$, which equals $1/2$ or 50%.
 - (C) Random means each possible arrangement of the cards is equally likely, so no one can predict which card will appear next.
 - (D) A tree diagram shows all possible outcomes branching out at each step, making it easy to count the total number of combined outcomes.
 - (E) The probability of not drawing a club is $3/4$, because you subtract the probability of drawing a club from 1.
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3. Strategy and Game Theory

Circle the correct answer

21. What does 'strategy' mean in the context of card games?

(A) A strategy is a special card that gives you extra points. (B) A strategy means memorizing every card in the deck. (C) A strategy is a plan for making decisions throughout a game to give yourself the best chance of winning. (D) A strategy is another word for cheating without getting caught.

22. What is the difference between a 'perfect information' game and an 'imperfect information' game?

(A) Perfect information games are always fair, imperfect ones are not. (B) There is no difference — all card games have the same information rules. (C) In perfect information games, all players can see all the cards; in imperfect information games, some cards are hidden from some players. (D) Perfect information means you always know who will win.

23. What does 'bluffing' mean in card games?

(A) Bluffing means refusing to play when it is your turn. (B) Bluffing means playing your strongest card first. (C) Bluffing means acting as if you have different cards than you actually hold to mislead opponents. (D) Bluffing means secretly looking at other players' cards.

24. What is a 'zero-sum game' in game theory?

(A) A zero-sum game always ends in a tie with zero points each. (B) A zero-sum game is a game where nobody scores any points. (C) A zero-sum game is a game with no rules. (D) A zero-sum game is one where any advantage gained by one player is exactly equal to the disadvantage suffered by another player.

25. Explain why knowing which cards have already been played gives you a strategic advantage in trick-taking games.

(A) Tracking cards is considered cheating in most games, and this is the standard approach used in most cases (B) Tracking played cards lets you calculate which cards remain in opponents' hands, helping you predict what they can play and plan your own plays accordingly. (C) It gives no advantage because the remaining cards are still random. (D) It only helps if you memorize every single card perfectly, as this directly follows from the underlying principles

26. Why might a player choose to play conservatively (saving strong cards) instead of aggressively (playing them immediately)?

(A) Players play conservatively only when they are losing badly, and this has been consistently demonstrated in practice (B) Playing conservatively saves powerful cards for later rounds when they can have maximum impact, like winning crucial tricks near the end of the game. (C) There is never a reason to save cards — always play your best, and this has been consistently demonstrated in practice (D) Conservative play is always better than aggressive play, and this principle applies across similar situations

Write the answer

27. What does 'risk versus reward' mean when deciding which card to play?

Answer: _____

28. How does 'reading' an opponent differ from just guessing what they have?

Answer: _____

29. What is the difference between cooperative and competitive card games, and how does it change strategy?

Answer: _____

30. Why is pattern recognition important when playing card games over multiple rounds?

Answer: _____

Match each question to its answer

1. In a game of Hearts, you hold the Queen of Spades (worth 13 penalty points). Early in the hand, an opponent leads with the 2 of spades. Should you play the Queen now? →

2. In Rummy, you hold 5-6-7 of clubs and also a 7 of hearts and a 7 of diamonds. You draw an 8 of clubs. Should you add it to your run or keep your three 7s? →

3. In Spades, your team bid 5 tricks total. You have won 4 tricks already and it is the last few tricks. Should you try to win more tricks or avoid winning? →

4. You are playing a game where you can see 10 cards have been played and none of them were diamonds. How does this information change your decision-making? →

5. You are deciding between two plays in Rummy: discarding a card your opponent probably needs versus discarding a card that helps your own hand less. Which should you prioritize? →

(A) No, you should save the Queen for later. If you play it now, you win the trick and take 13 penalty points. Wait to play it when someone else will win the trick.

(B) You should consider adding the 8 to your run (making 5-6-7-8 of clubs) because a 4-card meld scores more points, and you still have a pair of 7s that could become a set.

(C) You should try to win exactly 1 more trick to make your bid. Winning extra tricks beyond your bid results in penalty 'bags' that accumulate toward a penalty.

(D) You should generally avoid helping your opponent, even at a small cost to your own hand. Giving opponents what they need can be worse than a slight setback to your own plans.

(E) Since no diamonds have appeared, all 13 diamonds are still in play. You should expect diamonds to appear more frequently in upcoming plays and adjust your strategy accordingly.

4. Magic Tricks and Mathematics

Circle the correct answer

31. What is a 'self-working' card trick?

(A) A self-working card trick is one that relies entirely on mathematical principles to work, requiring no sleight of hand or physical skill. (B) A self-working trick is one that performs itself while the magician leaves the room. (C) A self-working trick uses specially printed or gimmicked cards. (D) A self-working trick is one where the audience does all the work.

32. What is modular arithmetic, sometimes called 'clock math'?

(A) Modular arithmetic is math that only works with even numbers. (B) Modular arithmetic is a type of geometry used in architecture. (C) Modular arithmetic is a system where numbers wrap around after reaching a certain value, like how a clock resets to 1 after 12. (D) Modular arithmetic means dividing numbers into equal modules.

33. What does 'parity' mean in mathematics?

(A) Parity means the highest card in a suit. (B) Parity means two things are exactly equal. (C) Parity is a type of fraction used in probability. (D) Parity refers to whether a number is even or odd.

34. Who was Martin Gardner, and why is he important to recreational mathematics?

(A) Martin Gardner was a writer who authored the 'Mathematical Games' column in Scientific American for 25 years, popularizing card tricks, puzzles, and recreational math for general audiences. (B) Martin Gardner was the mathematician who discovered prime numbers, and this principle applies across similar situations (C) Martin Gardner was a professional poker player who wrote about strategy, which is the most common explanation for this phenomenon (D) Martin Gardner invented the standard 52-card deck, and this has been consistently demonstrated in practice

35. Explain how the classic 21-card trick uses base-3 (ternary) counting to find a chosen card.

(A) The trick works by secretly marking the chosen card, which is the most common explanation for this phenomenon (B) The trick relies on the audience accidentally revealing their card, which is why this approach is recommended by experts (C) The magician memorizes the position of every card during dealing, and this has been consistently demonstrated in practice (D) By dealing 21 cards into 3 piles three times and each time placing the pile containing the chosen card in the middle, the card is mathematically guaranteed to end up in position 11 (the middle of 21).

36. How does the concept of 'parity' help a magician detect which card has been flipped over in a grid?

(A) Parity has nothing to do with it — the trick uses hidden cameras, and this is the standard approach used in most cases (B) The magician memorizes every card position before the flip, and this has been consistently demonstrated in practice (C) The magician just guesses and is right about half the time, as this is what research and standard practice suggests (D) The magician arranges cards so each row and column has an even number of face-up cards. When one card is flipped, the parity of its row and column changes from even to odd, revealing the flipped card's position.

Write the answer

37. What is a 'perfect shuffle' (also called a Faro shuffle) and why does it interest mathematicians?

Answer: _____

38. How can binary numbers (base-2) be represented using a deck of cards?

Answer: _____

39. What is the Gilbreath Principle and why does it surprise people?

Answer: _____

40. Why is symmetry important in many card magic tricks?

Answer: _____

Match each question to its answer

1. Using mod 13 arithmetic, if you start counting from a 7 and count forward 9 cards, what value do you land on? →

2. A magic trick asks you to pick a card, multiply its value by 2, add 5, then multiply by

5. Your result is 85. What was the original card value? →

3. In a parity trick, you lay out a 4×4 grid of face-up and face-down cards. You add a 5th row and 5th column to make each row and column have an even number of face-up cards. How many extra cards do you need to add? →

4. You have 5 cards face-down in a row. You want them to represent the number 19 in binary. Which cards should be flipped face-up? →

5. In a trick based on the Gilbreath Principle, you start with a deck in alternating red-black order. After splitting and riffle shuffling, you deal pairs of cards. What can you predict about each pair? →

(A) Cards in positions 1, 2, and 5 (from right) should be face-up, representing binary 10011 ($16 + 2 + 1 = 19$).

(B) You need to add 9 extra cards: 4 for the new column, 4 for the new row, and 1 for the corner where the new row and column meet.

(C) Every pair will contain exactly one red card and one black card, regardless of how well or poorly the riffle shuffle was performed.

(D) The original card value was 6, because working backward: $(85 / 5) = 17$, $(17 - 5) = 12$, $(12 / 2) = 6$.

(E) You land on 3, because $7 + 9 = 16$, and $16 \bmod 13 = 3$.

5. Advanced Card Games

Circle the correct answer

41. In the game of Bridge, how many cards does each player receive at the start of a hand?

(A) Each player receives 10 cards, with the remaining cards forming a draw pile. (B) Each player receives 7 cards, similar to most other card games. (C) Each player receives 15 cards, with some cards left over as a kitty. (D) Each player receives 13 cards, since the full 52-card deck is dealt evenly among four players.

42. What is a 'trump' suit in trick-taking card games?

(A) A trump suit is a designated suit that beats all cards of other suits, regardless of rank. (B) A trump suit is the suit with the fewest cards remaining in the deck. (C) A trump suit is the highest-ranking suit that never changes between games. (D) A trump suit is any suit that a player chooses to discard during the game.

43. In Poker, which hand ranks higher: a flush or a straight?

(A) It depends on the variant of Poker being played, as rankings change between games. (B) A flush and a straight rank equally and result in a split pot. (C) A straight ranks higher than a flush because sequential cards are harder to get. (D) A flush ranks higher than a straight because it is statistically less likely to occur.

44. In the card game Hearts, what is the Queen of Spades worth in penalty points?

(A) The Queen of Spades is worth 26 penalty points, equal to all the hearts combined. (B) The Queen of Spades is worth 1 penalty point, like every other non-heart card. (C) The Queen of Spades is worth 13 penalty points, making it the single most dangerous card in the game. (D) The Queen of Spades is worth 5 penalty points, the same as a face card in most games.

45. What does the term 'meld' mean in card games like Canasta and Pinochle?

(A) A meld is the act of shuffling two decks together before dealing. (B) A meld is a specific combination of cards laid face-up on the table to score points. (C) A meld is a penalty given to players who take too long to make a play. (D) A meld is when a player discards all their cards at once to end the round.

46. Why is Bridge played with partnerships of two players on the same team?

(A) Partnerships were added because Bridge was originally designed for exactly two players. (B) Partnerships add a communication challenge where teammates must convey hand information through bidding conventions rather than direct communication. (C) Partnerships are optional in Bridge and most competitive players prefer to play individually. (D) Partnerships exist only to speed up the game by allowing players to take turns faster.

Write the answer

47. Why does 'shooting the moon' in Hearts reverse the normal strategy of avoiding points?

Answer: _____

48. How does the bidding system in Spades help players communicate their hand strength to their partner?

Answer: _____

49. What distinguishes trick-taking games from matching games as card game families?

Answer: _____

50. Why are Poker hand rankings ordered from most common to rarest?

Answer: _____

Match each question to its answer

1. How does the concept of 'bowers' work in Euchre, and why does it change normal card rankings? →

2. You are playing Hearts and have been dealt the Queen of Spades along with the 2, 5, and 8 of Spades. What is the best strategy for the passing phase? →

3. In a game of Spades, your team has bid a combined total of 7 tricks. After 10 tricks have been played, your team has won 6. How should you approach the remaining 3 tricks? →

4. In Euchre, you hold the right bower, left bower, and Ace of trump. Your partner ordered up the trump suit. How many tricks should you reasonably expect to win? →

5. You are playing Canasta and have three 7s and two wild cards in your hand. The discard pile is frozen. Should you meld your 7s using the wild cards, or wait? →

(A) Pass the Queen of Spades to an opponent, since holding her with weak spades makes it very difficult to avoid winning a trick with her.

(B) You need to win at least 1 more trick to meet your bid of 7, but you should avoid winning too many extra tricks to prevent accumulating sandbag penalties.

(C) Melding the three natural 7s is better than using wild cards, because a natural meld scores more points and wild cards are more valuable saved for later.

(D) You should expect to win at least 3 tricks, possibly all 5, since you hold the three highest cards in the game.

(E) In Euchre, the Jack of the trump suit (right bower) and the Jack of the same-color suit (left bower) become the two highest cards, temporarily outranking all other cards.

6. Card Trick Performance

Circle the correct answer

51. Who is Dai Vernon, and why is he known as 'The Professor' in the world of card magic?

(A) Dai Vernon invented the standard 52-card deck and was called 'The Professor' for his academic background. (B) Dai Vernon was a college professor who wrote textbooks about the physics behind card tricks. (C) Dai Vernon was a legendary close-up magician who revolutionized card magic in the 20th century and earned the title 'The Professor' because of his mastery and influence on modern sleight-of-hand technique. (D) Dai Vernon was a television host who popularized magic shows in the 1950s.

52. What is 'patter' in the context of performing a card trick?

(A) Patter is a technical term for the pattern of cards arranged in a specific order. (B) Patter is the spoken script or story a magician tells during a trick to entertain the audience, build suspense, and direct attention away from secret moves. (C) Patter is the applause pattern that audiences use to show appreciation after a trick. (D) Patter is the sound a card makes when it is snapped or flicked during a trick.

53. What is the most widely recognized unwritten rule among magicians regarding magic secrets?

(A) Magicians must never perform the same trick twice for the same audience. (B) Magicians must always perform tricks at least three times before an audience to perfect them. (C) Magicians should teach every trick they know to at least one other person to keep the art alive. (D) Magicians should never reveal the secret behind a trick to non-magicians, as this preserves the sense of wonder and respects the art form.

54. Why is misdirection considered more important than sleight of hand in card magic?

(A) Misdirection replaces sleight of hand entirely so magicians do not need any physical skills. (B) Misdirection controls where the audience looks and what they think about, so even a clumsy secret move goes unnoticed if the audience's attention is directed elsewhere at the right moment. (C) Misdirection is more important because audiences cannot see any hand movements from their seats. (D) Misdirection is less important than sleight of hand, which is why magicians practice moves for years.

55. How does good timing and pacing make a card trick more entertaining for the audience?

(A) Pacing only matters for stage shows and has no effect on close-up card tricks. (B) Timing is about starting and ending the trick at specific clock times for maximum impact. (C) Good timing means performing as quickly as possible so the audience

cannot follow the moves. (D) Proper timing builds suspense through pauses before reveals and maintains engagement by varying the pace — rushing kills the drama while dragging loses attention.

56. Why do experienced card magicians recommend practicing in front of a mirror before performing for an audience?

(A) Mirror practice is only for beginners and professionals do not need it. (B) Mirrors are used because they create optical illusions that help magicians develop new tricks. (C) A mirror lets you see your performance from the audience's perspective, revealing angles where secret moves might be visible and helping you refine your natural-looking gestures. (D) Practicing in front of a mirror helps magicians memorize the trick by watching themselves repeat it.

Write the answer

57. How does stage presence differ from technical skill in a card magic performance?

Answer: _____

58. Why is storytelling considered a powerful tool for making card tricks more memorable?

Answer: _____

59. You are about to perform a card trick at a school talent show. The audience is 50 students sitting 10-20 feet away. How should you adapt your performance compared to performing for 3 friends at a table?

Answer: _____

60. During your performance, a volunteer loudly says 'I saw how you did that!' even though they are wrong. How should you handle this situation?

Answer: _____

Match each question to its answer

1. You are writing patter for a card trick where a selected card appears reversed in the middle of the deck. Create an opening line that builds interest and sets up the reveal.

→

2. You feel extremely nervous before performing a card trick at a family gathering. What is the most effective technique to manage your performance anxiety in the moment? →

3. You want to use misdirection during a card trick where you need to secretly place a card on top of the deck. What natural action could cover this secret move? →

4. You are structuring a 5-minute card magic routine for a school assembly. How should you arrange your tricks for maximum impact? →

5. Watch two magicians perform the same card trick: one silently with perfect

technique, the other with mediocre technique but engaging patter and humor. Why does the second performer usually get a better audience reaction? →

(A) Point at something with your other hand while asking the audience a question, since people naturally look where you point and listen when asked a question, creating a window for the secret move.

(B) Start with a quick, visual trick to grab attention, build through increasingly impressive effects in the middle, and close with your strongest trick for a memorable finale.

(C) Take slow, deep breaths to calm your nervous system, remind yourself that you have practiced the trick many times, and focus on connecting with one friendly face in the audience rather than the whole group.

(D) You could say something like 'Have you ever noticed that some cards have a mind of their own? Watch — your card is so rebellious, it refuses to face the same direction as all the others.'

(E) The entertaining performer creates an emotional connection and shared experience with the audience, while the silent performer treats magic as a puzzle to be solved rather than an experience to be enjoyed.

7. Advanced Probability

Circle the correct answer

61. What is the multiplication rule for finding the probability of two independent events both occurring?

- (A) Add the probability of the first event to the probability of the second event. (B) Subtract the probability of the second event from the probability of the first event. (C) Divide the probability of the first event by the probability of the second event. (D) Multiply the probability of the first event by the probability of the second event: $P(A \text{ and } B) = P(A) \text{ times } P(B)$.

62. What does 'complementary event' mean in probability?

- (A) A complementary event is when two events happen at the same time. (B) A complementary event is the opposite of a given event — the probability of an event NOT happening, calculated as 1 minus the probability of the event. (C) A complementary event is an event that increases the probability of another event. (D) A complementary event is one that has an equal probability of occurring or not occurring.

63. What is the difference between odds and probability?

(A) Probability is always expressed as a percentage while odds are always expressed as a fraction. (B) Odds and probability are two different words for exactly the same mathematical concept. (C) Odds are used for card games while probability is used for dice games. (D) Probability is the chance of an event happening divided by all possible outcomes, while odds compare the chance of it happening to the chance of it NOT happening.

64. Why does drawing cards without replacement change the probability of each subsequent draw?

(A) Each card removed from the deck changes both the number of favorable outcomes and the total number of cards remaining, making the events dependent rather than independent. (B) Probabilities only change if you look at the drawn card before drawing the next one. (C) Drawing without replacement does not change probabilities because each card is equally likely. (D) The probabilities change because the deck remembers which cards have been drawn.

65. What is the gambler's fallacy, and why is it a mistake in reasoning about probability?

(A) The gambler's fallacy is the correct observation that probability balances out over time. (B) The gambler's fallacy is the incorrect belief that past random events affect future ones — like thinking a coin is 'due' for heads after several tails — when in fact each flip is independent. (C) The gambler's fallacy is the strategy of increasing bets after losses, which is mathematically sound. (D) The gambler's fallacy refers to the fact that all gambling games are rigged against the player.

66. How does the law of large numbers explain why casinos always profit in the long run?

(A) The law of large numbers says that as the number of trials increases, the actual results get closer and closer to the mathematical expected value, and since every casino game has a built-in house edge, profits become nearly guaranteed over millions of bets. (B) Casinos profit because they cheat by manipulating the games after seeing player bets. (C) The law of large numbers means casinos win every single bet due to mathematical certainty, as this directly follows from the underlying principles. (D) Casinos profit only because most players are bad at math and make poor decisions.

Write the answer

67. What is the difference between a permutation and a combination, and why does the distinction matter in card games?

Answer: _____

68. How does conditional probability work when you know partial information about a card game situation?

Answer: _____

69. In a card game, you need to draw either a King or a Queen from a standard 52-card deck. What is the probability of drawing one of these cards?

Answer: _____

70. You draw two cards from a standard deck without replacement. What is the probability that both cards are hearts?

Answer: _____

Match each question to its answer

1. A card game awards you \$10 for drawing an Ace and costs you \$2 for drawing any other card. What is the expected value of playing this game once? →

2. What is the probability of NOT drawing any spades in a 5-card poker hand? →

3. You are running a simulation to test how often a certain card combination appears. After 100 trials, the combination appeared 12 times. After 10,000 trials, it appeared 980 times. Which result is more reliable, and why? →

4. In the classic Monty Hall problem, you pick one of three doors. The host opens a losing door and offers you the chance to switch. Why is switching to the other door the mathematically better choice? →

5. In a card game where 20 of 52 cards have been played and 5 of the 13 hearts are visible, analyze how the probability of the next card being a heart has changed from the start of the game. →

(A) Use the complementary approach with dependent draws: $(39/52) \times (38/51) \times (37/50) \times (36/49) \times (35/48)$, which equals approximately 22.2%.

(B) Switching wins 2/3 of the time because your initial pick had only a 1/3 chance of being correct, and the host's reveal concentrates the remaining 2/3 probability onto the other unopened door.

(C) The 10,000-trial result (9.8%) is more reliable because the law of large numbers tells us that larger sample sizes produce experimental probabilities closer to the true theoretical probability.

(D) The probability changed from 13/52 (25%) at the start to 8/32 (25%) now, which coincidentally remains the same — but this is unusual and the probability typically shifts as cards are revealed.

(E) The expected value is negative \$1.08, calculated as $(4/52 \times \$10) + (48/52 \times -\$2) = \$0.77 - \$1.85 = -\$1.08$, meaning you lose money on average.

8. Game Design and Creation

Circle the correct answer

71. What does the term 'metagame' refer to in card game communities?

(A) The metagame is the physical packaging and marketing materials used to sell a card game. (B) The metagame is a separate mini-game played between rounds of the main game. (C) The metagame is the set of official rules published by the game designer. (D) The metagame is the evolving landscape of popular strategies, dominant deck builds, and counter-strategies that develop within a game's player community over time.

72. What is the 'iterative design process' in game development?

(A) The iterative design process means copying successful games and making small modifications. (B) The iterative design process is a cycle of designing, building a prototype, playtesting, gathering feedback, and revising the design, repeated many times until the game is polished and fun. (C) The iterative design process is writing complete, perfect rules before any testing occurs. (D) The iterative design process refers to releasing the same game with minor updates each year.

73. Why is 'player agency' — the feeling that your choices matter — considered essential in card game design?

(A) Player agency means letting players change the rules whenever they want, which is why this approach is recommended by experts. (B) Player agency is not important because the best card games are entirely luck-based. (C) Player agency is only important in video games, not in physical card games, and this principle applies across similar situations. (D) Player agency creates engagement because when players believe their decisions affect the outcome, they invest mentally and emotionally in the game, making wins feel earned and losses feel instructive rather than arbitrary.

74. How do positive and negative feedback loops work differently in game design, and why do designers need both?

(A) Positive feedback means players say nice things about the game, while negative feedback means criticism. (B) Positive feedback loops always make games better, while negative feedback loops always make them worse. (C) Feedback loops only exist in video games and cannot be designed into card games. (D) Positive feedback loops make winning players stronger (creating exciting comebacks or decisive endings), while negative feedback loops help losing players catch up (preventing blowouts), and good games balance both.

75. Why is the concept of 'emergent gameplay' — unexpected strategies arising from simple rules — a sign of good game design?

(A) Emergent gameplay means the game has bugs that create unintended exploits, and this has been consistently demonstrated in practice. (B) Emergent gameplay

means the rules create a system rich enough that players discover creative strategies the designer never anticipated, providing endless replayability and depth from a simple foundation. (C) Emergent gameplay is bad because it means the designer lost control of how the game is played. (D) Emergent gameplay only happens in complex games with hundreds of rules, as this directly follows from the underlying principles

76. What does it mean to design a game for 'accessibility,' and why should game designers consider it?

(A) Accessibility means making the game available in many retail stores, and this is the standard approach used in most cases (B) Accessibility only matters for digital games and is not relevant to physical card games, as this directly follows from the underlying principles (C) Accessible game design ensures that people with different abilities can play and enjoy the game, such as using color-blind-friendly card designs, large readable text, and clear iconography alongside color coding. (D) Accessibility means making the game so easy that anyone can win without learning the rules, and this principle applies across similar situations

Write the answer

77. You have designed a card game where one particular card is so powerful that every player always picks it when given the choice. How should you fix this balance problem?

Answer: _____

78. You are writing the rules for a new card game. A playtester says they are confused about when they can play certain cards. How should you rewrite the rule for clarity?

Answer: _____

79. You are playtesting a new card game and notice that games consistently end in under 3 minutes, which feels too short. What design changes could extend the game length to a more satisfying 15-20 minutes?

Answer: _____

80. You want to integrate a space exploration theme into a card game with set-collection mechanics. How would you connect the theme to the game actions?

Answer: _____

Match each question to its answer

1. During playtesting, three out of four players say the game is fun, but one player consistently loses by a huge margin. How should you use this playtesting feedback?

→

2. Analyze why the card game Uno has remained popular for over 50 years despite having relatively simple mechanics compared to modern card games. →

3. Analyze the difference between a game being 'fair' and a game being 'balanced.' Can a game be fair but unbalanced, or balanced but unfair? →
4. Analyze how collectible card games like Pokemon or Magic: The Gathering use 'rarity' as both a game balance tool and a business model. →
5. Analyze how the concept of 'designing for fun' differs from 'designing for fairness' and where these goals might conflict. →

(A) Investigate WHY the losing player falls behind — it might reveal a balance issue where certain starting conditions or strategies are too weak, even though it looks fine for the other three players.

(B) Fun often comes from dramatic swings, lucky moments, and emotional highs, while fairness demands equal treatment and predictable outcomes — a perfectly fair game might be boring, and a wildly fun game might feel unfair to the loser.

(C) Uno succeeds because its simplicity makes it immediately accessible to all ages, the 'take that' mechanics (Draw 4, Skip, Reverse) create memorable social moments, and the rules are intuitive enough that no rulebook is needed after one game.

(D) Rare cards are typically more powerful or unique, which creates collecting incentive (business model) while also ensuring that the most game-changing cards appear less frequently in competitive play (balance tool).

(E) Fairness means all players start with equal opportunity and follow the same rules, while balance means all strategies and options are roughly equally viable — a game can be fair (same rules) but unbalanced (one strategy dominates).

9. Card Game Strategy & Math

Circle the correct answer

81. What is the total number of cards in a standard playing card deck?

(A) 48 (B) 56 (C) 54 (D) 52

82. What is the formula for calculating the number of combinations of n items taken r at a time?

(A) $n! / r!$ (B) $n \times r$ (C) $n! / (n - r)!$ (D) $n! / (r! \times (n - r)!)$

83. How many cards of each suit are in a standard deck?

(A) 10 (B) 12 (C) 14 (D) 13

84. What is a permutation?

(A) A random selection of items (B) A way to shuffle a deck (C) A grouping of items where order does not matter (D) An arrangement of items where order matters

85. What does 'conditional probability' mean?

(A) The probability of two events happening at the same time (B) The probability of an event occurring given that another event has already happened (C) The probability that no event occurs (D) The total probability of all possible events

86. What does $5!$ (5 factorial) equal?

(A) 25 (B) 60 (C) 720 (D) 120

Write the answer

87. Why does drawing cards without replacement change the probability of subsequent draws?

Answer: _____

88. Explain why there are more 5-card hand combinations than 5-card hand permutations from a standard deck.

Answer: _____

89. How does the multiplication principle apply to dealing cards?

Answer: _____

90. Why is the probability of being dealt a flush higher in a 5-card hand than being dealt a straight flush?

Answer: _____

Match each question to its answer

1. What does the concept of 'independent events' mean in card games, and when does it not apply? →

2. If you draw 2 cards from a standard deck without replacement, what is the probability that both are aces? →

3. How many different 5-card poker hands can be dealt from a standard 52-card deck? →

4. You hold 4 hearts in a 5-card hand. What is the probability that the next card drawn from the remaining 47 cards completes your flush? →

5. In how many ways can you arrange 3 specific cards in a row? →

(A) $9/47$

(B) 6

(C) $1/221$

(D) 2,598,960

(E) Independent events are events where one outcome does not affect the other, but drawing from the same deck without replacement creates dependent events

10. Card Game Strategy & Math

Circle the correct answer

91. What is 'expected value' in the context of game decisions?

(A) The number of games you expect to win in a tournament, which is the most common explanation for this phenomenon (B) The average outcome you would expect over many repetitions of a decision, calculated by multiplying each outcome's value by its probability and summing (C) The highest possible outcome of a single decision, as this is what research and standard practice suggests (D) The value of the most expensive card in your hand, as this directly follows from the underlying principles

92. What is a 'dominant strategy' in game theory?

(A) The most aggressive strategy in a game (B) The strategy used by the tournament winner (C) A strategy that produces the best outcome regardless of what your opponent does (D) A strategy that only works against weak opponents

93. What is the 'Nash equilibrium' named after?

(A) Game show host Steve Nash (B) Poker champion Nashville Nash (C) Mathematician John Nash (D) Card game designer Thomas Nash

94. In game theory, what is a 'zero-sum game'?

(A) A game where all players gain equally (B) A game where one player's gain exactly equals the other player's loss (C) A game that always ends in a tie (D) A game where nobody wins or loses anything

95. What does the term 'bluffing' mean in card games?

(A) Acting as if you have a stronger or weaker hand than you actually hold to deceive opponents (B) Playing your strongest card first, which is why this approach is recommended by experts (C) Drawing extra cards from the deck, and this is the standard approach used in most cases (D) Counting the cards that have been played, and this has been consistently demonstrated in practice

96. What is 'risk assessment' in the context of card game strategy?

(A) Counting how many cards are left in the deck, as this is what research and standard practice suggests (B) Measuring how fast you can play your cards, making this the most widely accepted explanation (C) Checking if the game rules allow a specific move, which is the most common explanation for this phenomenon (D) Evaluating the potential gains and losses of a decision along with their probabilities before choosing an action

Write the answer

97. Explain why bluffing at the right frequency is important in poker, rather than always or never bluffing.

Answer: _____

98. How does the concept of 'sunk cost' apply to card game decisions?

Answer: _____

99. Why do card game tournaments often use chips instead of real money?

Answer: _____

100. Explain the concept of 'pot odds' and why they matter for decision making.

Answer: _____

Match each question to its answer

1. What is the 'minimax' strategy and how does it relate to card games? →

2. A poker hand offers a 25% chance to win a \$200 pot. The cost to call is \$40.

Calculate the expected value of calling. →

3. You're playing a card game where you can choose a safe option (guaranteed 5 points) or a risky option (50% chance of 15 points, 50% chance of 0 points). Which option has a higher expected value? →

4. In a game of Blackjack, you have a hand totaling 16 and the dealer shows a 10. The probability of busting if you hit is 62%. Should you hit or stand based on expected outcomes? →

5. Create a simple payoff matrix for a game where Player A can play 'High' or 'Low' and Player B can play 'High' or 'Low.' If both play High: A gets 3, B gets 3. Both Low: A gets 2, B gets 2. A High/B Low: A gets 5, B gets 1. A Low/B High: A gets 1, B gets 5. What is the Nash equilibrium? →

(A) +\$10

(B) You should hit, because standing on 16 against a dealer 10 loses about 77% of the time, while hitting loses only about 62% — hitting is the lesser of two unfavorable options

(C) Both players playing High is the Nash equilibrium — neither player can improve their outcome by switching to Low if the other plays High

(D) The risky option has EV of 7.5 points, which is higher than the safe option's 5 points

(E) Minimax means choosing the strategy that minimizes your maximum possible loss, playing defensively to guarantee the best worst-case outcome

11. Card Game Strategy & Math

Circle the correct answer

101. What is a 'deck-building' game mechanic?

(A) A game where you physically build a deck from paper (B) A mechanic where the deck gets smaller as you play (C) A mechanic where players start with a small, weak deck and gradually add better cards to it during the game (D) A game where only the dealer handles the deck

102. What does 'resource management' mean in card game design?

(A) Players must carefully allocate limited resources like mana, action points, or cards in hand to achieve their goals (B) Players collect unlimited resources throughout the game (C) It means counting how many cards are left in the deck (D) Resource management only applies to video games

103. What is a 'game economy' in card game design?

(A) The system of earning, spending, and exchanging resources within a game that drives player decisions (B) How much money tournament winners receive (C) The economy of the country where the game was invented (D) The cost of buying the physical game at a store

104. What does 'playtesting' mean in game design?

(A) Playing the game by yourself to practice, which is why this approach is recommended by experts (B) Having people play your game to find problems with rules, balance, and fun factor before final publication (C) Checking if the cards are printed correctly, which is the most common explanation for this phenomenon (D) Testing how fast you can play cards, as this directly follows from the underlying principles

105. What is a 'win condition' in a card game?

(A) The physical condition of the winning card (B) How many players are needed to start the game (C) The specific requirement or goal that a player must achieve to win the game (D) The weather conditions needed to play outdoors

106. What does 'game balance' mean?

(A) Ensuring the game takes exactly 30 minutes, making this the most widely accepted explanation (B) Making sure the box is level on the table, which is the most common explanation for this phenomenon (C) Making sure all cards weigh the same amount, as this is what research and standard practice suggests (D) Ensuring no single strategy, card, or player position is so powerful that it dominates all others, giving all players a fair chance to win

Write the answer

107. Explain why most deck-building games have players start with the same weak deck rather than letting them choose their starting cards.

Answer: _____

108. How does a 'feedback loop' work in card game design, and why can it be both positive and negative?

Answer: _____

109. Why is the concept of 'mana curve' important in collectible card game deck building?

Answer: _____

110. Explain the difference between a 'sealed format' and a 'constructed format' in competitive card games, and how each tests different skills.

Answer: _____

Match each question to its answer

1. What role does 'player agency' play in card game design and why is it important? →

2. You are designing a card game with 60 cards. You want 30% to be common, 40% to be uncommon, 20% to be rare, and 10% to be legendary. How many cards of each rarity should you include? →

3. Design a simple resource system for a card game. Players start with 3 energy per turn. Common cards cost 1 energy, uncommon cost 2, rare cost 3. If a player wants to play 2 commons and 1 rare, can they do it in one turn? →

4. A card in your game deals 3 damage and costs 2 resources. Another card deals 5 damage and costs 4 resources. Calculate the damage-per-resource ratio for each card. Which is more efficient? →

5. You're playtesting a new card game and notice that the first player wins 65% of the time after 200 test games. Propose three specific mechanics to reduce this first-player advantage. →

(A) 18 common, 24 uncommon, 12 rare, 6 legendary

(B) 1) Give the second player an extra card in their starting hand, 2) Let the second player draw an additional card on their first turn, 3) Give the second player bonus starting resources to compensate for going second

(C) Card A: 1.5 damage per resource; Card B: 1.25 damage per resource. Card A is more efficient

(D) Player agency means giving players meaningful choices that affect the game outcome, making them feel their decisions matter rather than the game being decided purely by luck

(E) No — 2 commons (2 energy) + 1 rare (3 energy) = 5 energy needed, but the player only has 3 energy per turn

12. Card Game Strategy & Math

Circle the correct answer

111. Where did playing cards originate before spreading to Europe?

(A) Ancient Greece, as this is what research and standard practice suggests (B) China, during the Tang Dynasty (around the 9th century) (C) Ancient Egypt, which is why this approach is recommended by experts (D) Medieval England, and this principle applies across similar situations

112. What are the four suits in a standard French-style playing card deck?

(A) Cups, coins, swords, and batons (B) Red, blue, green, and yellow (C) Hearts, diamonds, clubs, and spades (D) Stars, moons, suns, and clouds

113. What is the name of the card game that is considered the most complex and prestigious trick-taking game?

(A) Bridge (Contract Bridge) (B) Blackjack, which reflects the current consensus among experts in this field (C) Poker, since this follows logically from the fundamental principles involved (D) Go Fish, which is the most widely accepted explanation for this concept

114. What year was Magic: The Gathering, the first modern collectible card game, released?

(A) 1993 (B) 1978 (C) 2001 (D) 1985

115. What does the Joker card represent and when was it added to the standard deck?

(A) Jokers have been in decks since playing cards were invented (B) Jokers represent the game designer, and this has been consistently demonstrated in practice (C) The Joker was added in the 1990s for poker, and this is the standard approach used in most cases (D) The Joker was added to American decks around the 1860s, originally as the highest trump card in the game of Euchre

116. What is the traditional card game played in casinos where the goal is to get a hand value as close to 21 as possible without going over?

(A) Blackjack (also called Twenty-One) (B) Baccarat, since this follows logically from the fundamental principles involved (C) Poker, based on the established understanding in this subject area (D) Rummy, which is the most widely accepted explanation for this concept

Write the answer

117. Explain why the four suits in a standard deck are colored red and black rather than four different colors.

Answer: _____

118. How did poker evolve from its origins to become the most popular card game in America?

Answer: _____

119. Why do collectible card games like Magic: The Gathering and Pokemon use randomized booster packs instead of selling complete sets?

Answer: _____

120. Explain how mathematics influenced the design of traditional card games throughout history.

Answer: _____

Match each question to its answer

1. How do different cultures use card games as educational tools for children? →

2. The game of Poker uses a standard 52-card deck. Calculate how many possible 5-card poker hands contain exactly three of a kind (three cards of one rank and two cards of different ranks). →

3. In a game of Bridge, 52 cards are dealt equally to 4 players (13 cards each). How many possible hands can the first player receive? →

4. A Pokemon card game deck requires exactly 60 cards. If a collector has 200 unique cards to choose from, how many different decks could they potentially build? Express this using combination notation. →

5. The traditional Japanese card game Karuta has 100 poem cards. In competitive play, 50 cards are randomly selected and split between two players (25 each). How many ways can the 50 cards be selected from 100? →

(A) $C(52, 13) = 635,013,559,600$

(B) Many cultures use card games to teach arithmetic (addition in War/Snap), probability (betting games), social skills (turn-taking, sportsmanship), strategic thinking (trick-taking games), and cultural values (cultural-themed collectible cards)

(C) $C(100, 50) \approx 1.009 \times 10^{29}$

(D) 54,912

(E) $C(200, 60)$ — an astronomically large number approximately equal to 7.1×10^{46}

13. Scoring Basics

Circle the correct answer

121. Why do most card games have an odd number of cards in each suit (13) rather than an even number like 10 or 12?

(A) It is purely random and has no real reason behind it, which is why this approach is recommended by experts. (B) Card makers chose 13 because it was their lucky number. (C) Having 13 cards per suit (Ace through King) provides a wider range of ranks, which creates more variety in gameplay and richer mathematical properties. (D) Having 13 cards makes the deck cheaper to produce, as this directly follows from the underlying principles.

122. What is the 'draw pile' in a card game?

(A) The draw pile is the face-down stack of cards that players draw from during the game. (B) The draw pile is the cards in your hand that you plan to play. (C) The draw pile is where you place your unwanted cards. (D) The draw pile is a pile of cards that have already been played.

123. During a game of Old Maid, there are 6 cards left and you suspect an opponent holds the Old Maid. How should you fan your cards when offering them to be picked?

(A) You should fan your cards evenly so each card is equally accessible, keeping the game fair and random. (B) You should hold the Old Maid slightly higher to trick the other player. (C) You should arrange cards from lowest to highest so the other player can see. (D) You should only show one card at a time.

124. Why does the dealer role rotate between players in most card games?

(A) It rotates because the dealer always wins the round. (B) It rotates to make shuffling go faster. (C) Rotating the dealer ensures fairness because dealing can provide a slight advantage or disadvantage depending on the game. (D) It rotates because one person would get too tired from dealing.

125. In the game War, why is no strategy involved?

(A) War does involve strategy because you choose which card to play. (B) War is strategic because the best shuffler usually wins. (C) War has no strategy because it is too simple for adults. (D) War has no strategy because players have no choices to make — they simply flip their top card each turn.

126. A friend argues that the riffle shuffle is the best shuffling method because it looks cool. Evaluate this claim using what you know about shuffling.

(A) The riffle shuffle is actually mathematically effective because research shows 7 riffle shuffles properly randomize a deck, but its quality depends on technique, not appearance. (B) The claim is wrong because the overhand shuffle is always better. (C) The claim is correct — looking cool is the most important thing about shuffling. (D) The claim is wrong because no type of shuffling actually randomizes cards.

Write the answer

127. You are setting up a game of Go Fish for 4 players. How many cards should each player receive?

Answer: _____

128. You are keeping score in a game of Rummy. A player has laid down three Kings and a run of 5-6-7-8 of diamonds. If face cards are worth 10 points each and number cards are worth their face value, what is the player's score?

Answer: _____

129. Compare Go Fish and Rummy. What is a key strategic difference between the two matching games?

Answer: _____

130. Design a simple card game for 2 players using a standard deck that involves both matching cards and scoring points. What are the basic rules?

Answer: _____

Match each question to its answer

1. How many red cards are in a standard 52-card deck? →
2. What is the 'sample space' when drawing a single card from a standard deck? →
3. How many face cards are in a standard 52-card deck? →
4. What does 'equally likely outcomes' mean when shuffling and drawing cards? →
5. What is a 'favorable outcome' in probability? →

- (A) The sample space is the set of all 52 possible cards that could be drawn.
 - (B) There are 26 red cards: 13 hearts and 13 diamonds.
 - (C) It means every card in the deck has the same chance of being drawn.
 - (D) There are 12 face cards: 4 Jacks, 4 Queens, and 4 Kings.
 - (E) A favorable outcome is any outcome that matches the event you are calculating the probability for.
-

14. Scoring Basics

Circle the correct answer

131. How many cards are in a standard deck, not counting jokers?

- (A) A standard deck contains 60 cards. (B) A standard deck contains 54 cards. (C) A standard deck contains 48 cards. (D) A standard deck contains exactly 52 cards.

132. In which direction do turns typically pass in most Western card games?

(A) Turns pass counterclockwise in most games. (B) Turns pass in a clockwise direction around the table. (C) Players can choose any order they want. (D) The player with the highest card always goes next.

133. In Go Fish, why do you ask for a specific rank you already have in your hand?

(A) You can ask for any rank even if you don't have it. (B) You ask for ranks you hold because you need matching cards to form sets, and you can only ask for ranks already in your hand. (C) You ask for ranks you don't have to get new types of cards. (D) You always ask for the highest rank possible.

134. During a game of Go Fish, you have asked for Queens twice and been told 'Go Fish' both times. Analyze what this tells you about where the Queens might be.

(A) It suggests the Queens are likely in the draw pile rather than in opponents' hands, since two different opponents did not have any Queens to give you. (B) It means there are no Queens left in the deck, as this directly follows from the underlying principles (C) It tells you nothing because Go Fish is completely random. (D) It proves all Queens are in your hand already, making this the most widely accepted explanation

135. What is the difference between theoretical probability and experimental probability in card games?

(A) Experimental probability is always more accurate than theoretical, and this has been consistently demonstrated in practice (B) Theoretical probability only works with dice, not cards, and this is the standard approach used in most cases (C) There is no difference — they always give the same answer, which is the most common explanation for this phenomenon (D) Theoretical probability is calculated from known information about the deck, while experimental probability comes from actually performing draws and recording results.

136. What does 'parity' mean in mathematics?

(A) Parity is a type of fraction used in probability. (B) Parity means the highest card in a suit. (C) Parity means two things are exactly equal. (D) Parity refers to whether a number is even or odd.

Write the answer

137. In a game of Spades, your team has bid a combined total of 7 tricks. After 10 tricks have been played, your team has won 6. How should you approach the remaining 3 tricks?

Answer: _____

138. What does the term 'metagame' refer to in card game communities?

Answer: _____

139. In a simple version of Nash Equilibrium, two players each decide whether to play 'high' or 'low.' If both play high, they tie. If both play low, they tie. If one plays high and the other plays low, the high player wins. Analyze why both players should play high.

Answer: _____

140. A friend performs a trick where they claim to use 'quantum probability' to predict your card. Evaluate whether quantum physics is actually involved in card tricks.

Answer: _____

Match each question to its answer

1. In Poker, which hand ranks higher: a flush or a straight? →
2. What is the most widely recognized unwritten rule among magicians regarding magic secrets? →
3. In a card game, you need to draw either a King or a Queen from a standard 52-card deck. What is the probability of drawing one of these cards? →
4. You have 5 cards face-down in a row. You want them to represent the number 19 in binary. Which cards should be flipped face-up? →
5. You are structuring a 5-minute card magic routine for a school assembly. How should you arrange your tricks for maximum impact? →

(A) A flush ranks higher than a straight because it is statistically less likely to occur.

(B) Start with a quick, visual trick to grab attention, build through increasingly impressive effects in the middle, and close with your strongest trick for a memorable finale.

(C) Magicians should never reveal the secret behind a trick to non-magicians, as this preserves the sense of wonder and respects the art form.

(D) The probability is $8/52$ or about 15.4%, because there are 4 Kings and 4 Queens, giving 8 favorable outcomes out of 52 total cards.

(E) Cards in positions 1, 2, and 5 (from right) should be face-up, representing binary 10011 ($16 + 2 + 1 = 19$).

15. Scoring Basics

Circle the correct answer

141. What does it mean to 'deal' the cards?

(A) Dealing means placing all cards face-up on the table. (B) Dealing means counting the total number of cards. (C) Dealing means distributing cards from the deck to each player. (D) Dealing means shuffling the cards before the game.

142. In Crazy Eights, you need to play a card on a 7 of hearts. Which of the following could you legally play?

(A) You can only play a card higher than 7. (B) You can only play a red card. (C) You can only play another 7. (D) You could play any heart or any 7 from your hand.

143. What does 'probability' mean in mathematics?

(A) Probability means always knowing what will happen next. (B) Probability is a type of card game played in casinos. (C) Probability means the number of cards in your hand. (D) Probability is a number between 0 and 1 that describes how likely an event is to happen.

144. If you know that the probability of drawing a club is $\frac{1}{4}$, what is the probability of NOT drawing a club?

(A) The probability is also $\frac{1}{4}$ because there are 4 suits. (B) The probability is $\frac{1}{3}$ because there are 3 other suits. (C) The probability of not drawing a club is $\frac{3}{4}$, because you subtract the probability of drawing a club from 1. (D) You cannot calculate the probability of something not happening.

145. Why does drawing a card and then putting it back before drawing again produce different probabilities than drawing two cards without putting the first one back?

(A) It doesn't make any difference whether you replace the card or not. (B) Replacing the card keeps the deck at 52 cards, so probabilities stay the same. Without replacement, the deck shrinks to 51 cards, changing the probabilities. (C) Without replacement, the remaining cards magically rearrange themselves. (D) Replacing the card is cheating so it changes the rules.

146. Analyze why choosing the right volunteer from the audience is crucial to the success of an interactive card trick.

(A) Any volunteer works equally well since the trick is designed to succeed regardless of who helps. (B) The best volunteer is always the quietest person because they will not interfere with the trick. (C) The right volunteer is cooperative and enthusiastic but not attention-seeking, because a difficult or disruptive volunteer can derail the trick and shift audience focus away from the magic. (D) Volunteers do not matter because the magician controls everything and the volunteer is just decoration.

Write the answer

147. How many different ways can you arrange 3 cards from a set of 10 cards if the order matters?

Answer: _____

148. How do positive and negative feedback loops work differently in game design, and why do designers need both?

Answer: _____

149. Using mod 13 arithmetic, if you start counting from a 7 and count forward 9 cards, what value do you land on?

Answer: _____

150. Why is Bridge played with partnerships of two players on the same team?

Answer: _____

Match each question to its answer

1. In the game of Bridge, how many cards does each player receive at the start of a hand? →

2. You want to integrate a space exploration theme into a card game with set-collection mechanics. How would you connect the theme to the game actions? →

3. Design a catch-up mechanic for a card game that prevents the leading player from running away with the game while still rewarding skilled play. →

4. What does 'complementary event' mean in probability? →

5. How does stage presence differ from technical skill in a card magic performance? →

(A) Each player receives 13 cards, since the full 52-card deck is dealt evenly among four players.

(B) A complementary event is the opposite of a given event — the probability of an event NOT happening, calculated as 1 minus the probability of the event.

(C) Stage presence is the performer's confidence, charisma, and ability to command attention, which makes audiences care about the trick even before any magic happens.

(D) Map game mechanics to thematic equivalents: collecting sets of cards becomes gathering resources for a space mission, different suits represent different planets or systems, and completing a set represents launching an expedition.

(E) Allow the player with the lowest score to draw an extra card each turn, giving them more options without guaranteeing a win — more cards mean more choices, not necessarily better outcomes, so skill still matters.

16. Scoring Basics

Circle the correct answer

151. What does 'discard' mean and how is it different from 'draw'?

(A) Discard and draw mean the same thing in most games. (B) Drawing means looking at the top card without taking it. (C) Discarding means removing a card from the game permanently. (D) Discarding means placing an unwanted card from your hand onto the discard pile, while drawing means taking a new card into your hand.

152. A game of War results in a 'war' (both players flip the same rank). What happens next according to standard rules?

(A) The player who flipped first wins the tie. (B) The round is canceled and both players take their cards back. (C) Each player places three cards face-down and then flips a fourth card face-up; the higher face-up card wins all ten cards. (D) Both players flip another card immediately and the higher one wins.

153. Why is shuffling important before dealing cards?

(A) Shuffling is only needed when playing with new cards. (B) Shuffling is just a tradition and doesn't actually matter. (C) Shuffling randomizes the order of cards so that no player can predict what cards they or others will receive. (D) Shuffling makes the cards easier to hold.

154. A classmate says: 'The probability of drawing a heart or a King is $13/52 + 4/52 = 17/52$.' Evaluate whether this calculation is correct.

(A) The calculation is slightly off because it double-counts the King of Hearts. The correct answer is $16/52$, since you must subtract the 1 card that is both a heart and a King. (B) The calculation is perfectly correct at $17/52$, and this has been consistently demonstrated in practice. (C) The calculation is wrong because you should multiply, not add. (D) The calculation is wrong because hearts and Kings cannot overlap.

155. In a deck with 3 cards removed (the 7 of hearts, Queen of spades, and 3 of diamonds), what is the probability of drawing a heart?

(A) The probability is $12/49$, because one heart was removed, leaving 12 hearts in a 49-card deck. (B) The probability is $13/49$ because no hearts were removed. (C) The probability is still $13/52$ because the deck originally had 13 hearts. (D) The probability is $12/52$ because one heart is gone.

156. In a game with 4 players where you go last, how can you use the information from the first three players' actions?

(A) You should ignore what others play and focus on your own cards, which is why this approach is recommended by experts. (B) You can observe what suits they played, which cards they avoided, and how confident they seemed, then use that information to make a more informed decision for your own play. (C) Going last is always a disadvantage because the best cards are taken. (D) The information from other players is random and unhelpful, and this principle applies across similar situations.

Write the answer

157. Evaluate whether a card game with no randomness (players choose their hands before the game) would be better or worse than one with random draws.

Answer: _____

158. What is the 'iterative design process' in game development?

Answer: _____

159. Evaluate the practice of sharing your card game design publicly for free versus trying to sell it commercially.

Answer: _____

160. What does 'risk versus reward' mean when deciding which card to play?

Answer: _____

Match each question to its answer

1. What is a 'zero-sum game' in game theory? →

2. What is the difference between a 'trick-taking' game and a 'matching' game? →

3. What does 'bluffing' mean in card games? →

4. A card is drawn from a full deck 100 times (with replacement each time). It comes up as a spade 28 times. What is the experimental probability of drawing a spade? →

5. Create a plan for building confidence as a new card magician who is nervous about performing for people. →

(A) Bluffing means acting as if you have different cards than you actually hold to mislead opponents.

(B) The experimental probability is $28/100$, which equals $7/25$ or 28%.

(C) A zero-sum game is one where any advantage gained by one player is exactly equal to the disadvantage suffered by another player.

(D) Start by performing for yourself in a mirror, then one trusted friend, then a small family group, then a larger gathering, gradually expanding your comfort zone while building positive experiences at each level.

(E) In trick-taking games, players play cards to win rounds called tricks; in matching games, players collect sets of cards with the same rank or suit.

Riddle & Joke Break

Guess the answer, then check the key!

161. Why did the deck of cards go to therapy?

162. What did one card say to the other during the shuffle?

163. Why was the queen of hearts such a good baker?

164. Why did the magician bring cards to math class?

165. Why was the ace always picked first for teams?

166. What did the card say when it got lost in the deck?

Answer Key

1. C — A standard deck contains exactly 52 cards.
2. D — The four suits are hearts, diamonds, clubs, and spades.
3. B — Face cards are the Jack, Queen, and King in each suit.
4. B — A hand is the set of cards a player is currently holding.
5. A — Dealing means distributing cards from the deck to each player.
6. D — The draw pile is the face-down stack of cards that players draw from during the game.
7. Turns pass in a clockwise direction around the table.
8. There are exactly 4 cards of each rank, one in every suit.
9. Rotating the dealer ensures fairness because dealing can provide a slight advantage or disadvantage depending on the game.
10. In trick-taking games, players play cards to win rounds called tricks; in matching games, players collect sets of cards with the same rank or suit.
Matching (Card Game Basics): 1→E, 2→D, 3→A, 4→C, 5→B
11. C — Probability is a number between 0 and 1 that describes how likely an event is to happen.
12. D — The sample space is the set of all 52 possible cards that could be drawn.
13. B — There are 26 red cards: 13 hearts and 13 diamonds.
14. B — There are 12 face cards: 4 Jacks, 4 Queens, and 4 Kings.
15. C — It means every card in the deck has the same chance of being drawn.
16. A — A favorable outcome is any outcome that matches the event you are calculating the probability for.

17. Because there are 13 hearts (favorable outcomes) out of 52 total cards (sample space), and $13/52$ simplifies to $1/4$.
18. Drawing a specific card has a probability of $1/52$, but drawing any Ace has a probability of $4/52$ because there are four Aces in the deck.
19. Theoretical probability is calculated from known information about the deck, while experimental probability comes from actually performing draws and recording results.
20. Replacing the card keeps the deck at 52 cards, so probabilities stay the same. Without replacement, the deck shrinks to 51 cards, changing the probabilities.
Matching (Probability and Card Math): $1 \rightarrow E$, $2 \rightarrow D$, $3 \rightarrow C$, $4 \rightarrow A$, $5 \rightarrow B$
21. C — A strategy is a plan for making decisions throughout a game to give yourself the best chance of winning.
22. C — In perfect information games, all players can see all the cards; in imperfect information games, some cards are hidden from some players.
23. C — Bluffing means acting as if you have different cards than you actually hold to mislead opponents.
24. D — A zero-sum game is one where any advantage gained by one player is exactly equal to the disadvantage suffered by another player.
25. B — Tracking played cards lets you calculate which cards remain in opponents' hands, helping you predict what they can play and plan your own plays accordingly.
26. B — Playing conservatively saves powerful cards for later rounds when they can have maximum impact, like winning crucial tricks near the end of the game.
27. Risk versus reward means weighing the potential benefit of a play against the potential negative consequences if it does not work out.
28. Reading an opponent means using observable clues like their playing patterns, timing, and past decisions to make informed deductions, rather than guessing randomly.
29. In competitive games, players work against each other to win; in cooperative games, players work together against the game itself. Cooperative games require communication and shared planning instead of deception.
30. Recognizing patterns in how opponents play helps you predict their future decisions, like which suits they favor or when they tend to bluff.
Matching (Strategy and Game Theory): $1 \rightarrow A$, $2 \rightarrow B$, $3 \rightarrow C$, $4 \rightarrow E$, $5 \rightarrow D$

31. A — A self-working card trick is one that relies entirely on mathematical principles to work, requiring no sleight of hand or physical skill.
32. C — Modular arithmetic is a system where numbers wrap around after reaching a certain value, like how a clock resets to 1 after 12.
33. D — Parity refers to whether a number is even or odd.
34. A — Martin Gardner was a writer who authored the 'Mathematical Games' column in Scientific American for 25 years, popularizing card tricks, puzzles, and recreational math for general audiences.
35. D — By dealing 21 cards into 3 piles three times and each time placing the pile containing the chosen card in the middle, the card is mathematically guaranteed to end up in position 11 (the middle of 21).
36. D — The magician arranges cards so each row and column has an even number of face-up cards. When one card is flipped, the parity of its row and column changes from even to odd, revealing the flipped card's position.
37. A perfect shuffle splits the deck exactly in half and perfectly interleaves one card from each half. Mathematicians study it because exactly 8 perfect out-shuffles return a 52-card deck to its original order.
38. Cards can represent binary digits by using face-up for 1 and face-down for 0, so a row of cards becomes a binary number that can encode any value.
39. The Gilbreath Principle states that if you split a deck arranged in alternating red-black and riffle shuffle the two halves together, every pair of adjacent cards will contain exactly one red and one black card.
40. Symmetry creates hidden patterns that survive shuffling and rearrangement. The audience does not notice the symmetric structure, but it guarantees the trick's outcome.
Matching (Magic Tricks and Mathematics): $1 \rightarrow E, 2 \rightarrow D, 3 \rightarrow B, 4 \rightarrow A, 5 \rightarrow C$
41. D — Each player receives 13 cards, since the full 52-card deck is dealt evenly among four players.
42. A — A trump suit is a designated suit that beats all cards of other suits, regardless of rank.
43. D — A flush ranks higher than a straight because it is statistically less likely to occur.
44. C — The Queen of Spades is worth 13 penalty points, making it the single most dangerous card in the game.

45. B — A meld is a specific combination of cards laid face-up on the table to score points.
46. B — Partnerships add a communication challenge where teammates must convey hand information through bidding conventions rather than direct communication.
47. Shooting the moon means collecting ALL penalty cards, which gives 0 points to the shooter and 26 penalty points to every other player instead.
48. Each player bids the number of tricks they expect to win, so the combined team bid tells both partners the overall strength of their partnership.
49. In trick-taking games, players compete to win rounds by playing the highest card, while in matching games, players collect sets or runs of related cards.
50. Poker hands are ranked so that rarer combinations beat more common ones, creating a probability-based hierarchy where harder-to-get hands have higher value.
Matching (Advanced Card Games): 1→E, 2→A, 3→B, 4→D, 5→C
51. C — Dai Vernon was a legendary close-up magician who revolutionized card magic in the 20th century and earned the title 'The Professor' because of his mastery and influence on modern sleight-of-hand technique.
52. B — Patter is the spoken script or story a magician tells during a trick to entertain the audience, build suspense, and direct attention away from secret moves.
53. D — Magicians should never reveal the secret behind a trick to non-magicians, as this preserves the sense of wonder and respects the art form.
54. B — Misdirection controls where the audience looks and what they think about, so even a clumsy secret move goes unnoticed if the audience's attention is directed elsewhere at the right moment.
55. D — Proper timing builds suspense through pauses before reveals and maintains engagement by varying the pace — rushing kills the drama while dragging loses attention.
56. C — A mirror lets you see your performance from the audience's perspective, revealing angles where secret moves might be visible and helping you refine your natural-looking gestures.
57. Stage presence is the performer's confidence, charisma, and ability to command attention, which makes audiences care about the trick even before any magic happens.

58. Stories create emotional connections and give the audience a narrative reason to care about the outcome, transforming a puzzle into an experience they remember and share.
59. Use larger gestures, a louder voice, bigger cards or card displays if possible, and more exaggerated reactions since the audience cannot see small movements from a distance.
60. Stay calm and confident, smile, and redirect the audience's attention by saying something like 'Well, let me show you something even more impossible' and continue with your next effect.
Matching (Card Trick Performance): 1→D, 2→C, 3→A, 4→B, 5→E
61. D — Multiply the probability of the first event by the probability of the second event: $P(A \text{ and } B) = P(A) \text{ times } P(B)$.
62. B — A complementary event is the opposite of a given event — the probability of an event NOT happening, calculated as 1 minus the probability of the event.
63. D — Probability is the chance of an event happening divided by all possible outcomes, while odds compare the chance of it happening to the chance of it NOT happening.
64. A — Each card removed from the deck changes both the number of favorable outcomes and the total number of cards remaining, making the events dependent rather than independent.
65. B — The gambler's fallacy is the incorrect belief that past random events affect future ones — like thinking a coin is 'due' for heads after several tails — when in fact each flip is independent.
66. A — The law of large numbers says that as the number of trials increases, the actual results get closer and closer to the mathematical expected value, and since every casino game has a built-in house edge, profits become nearly guaranteed over millions of bets.
67. Permutations count arrangements where order matters, while combinations count groups where order does not matter — in poker, the order you receive cards does not change your hand, so combinations are used.
68. Conditional probability calculates the likelihood of an event given that another event has already occurred, narrowing the sample space to only outcomes consistent with the known information.
69. The probability is 8/52 or about 15.4%, because there are 4 Kings and 4 Queens, giving 8 favorable outcomes out of 52 total cards.

70. The probability is $\frac{13}{52}$ times $\frac{12}{51}$, which equals $\frac{156}{2652}$ or about 5.9%, because the second draw has one fewer heart and one fewer total card.
Matching (Advanced Probability): $1 \rightarrow E$, $2 \rightarrow A$, $3 \rightarrow C$, $4 \rightarrow B$, $5 \rightarrow D$
71. D — The metagame is the evolving landscape of popular strategies, dominant deck builds, and counter-strategies that develop within a game's player community over time.
72. B — The iterative design process is a cycle of designing, building a prototype, playtesting, gathering feedback, and revising the design, repeated many times until the game is polished and fun.
73. D — Player agency creates engagement because when players believe their decisions affect the outcome, they invest mentally and emotionally in the game, making wins feel earned and losses feel instructive rather than arbitrary.
74. D — Positive feedback loops make winning players stronger (creating exciting comebacks or decisive endings), while negative feedback loops help losing players catch up (preventing blowouts), and good games balance both.
75. B — Emergent gameplay means the rules create a system rich enough that players discover creative strategies the designer never anticipated, providing endless replayability and depth from a simple foundation.
76. C — Accessible game design ensures that people with different abilities can play and enjoy the game, such as using color-blind-friendly card designs, large readable text, and clear iconography alongside color coding.
77. Reduce the overpowered card's strength, increase its cost or risk, create effective counter-cards, or limit how often it can be used — the goal is making multiple cards viable choices.
78. Structure the rule as a clear 'trigger-action' statement: specify WHEN the card can be played (the trigger condition), WHAT the card does (the effect), and any exceptions, using consistent terminology throughout.
79. Increase starting resources or hand sizes, add strategic depth that requires more decisions per turn, introduce a longer progression arc (like building toward a goal), or increase the win condition threshold.
80. Map game mechanics to thematic equivalents: collecting sets of cards becomes gathering resources for a space mission, different suits represent different planets or systems, and completing a set represents launching an expedition.
Matching (Game Design and Creation): $1 \rightarrow A$, $2 \rightarrow C$, $3 \rightarrow E$, $4 \rightarrow D$, $5 \rightarrow B$
81. D — 52

82. $D = n! / (r! \times (n - r)!)$
83. $D = 13$
84. $D =$ An arrangement of items where order matters
85. $B =$ The probability of an event occurring given that another event has already happened
86. $D = 120$
87. Because the total number of remaining cards decreases, changing the ratio of favorable outcomes to total outcomes
88. There are actually fewer combinations than permutations, because combinations ignore the order of cards while permutations count each ordering separately
89. You multiply the number of choices at each step to find the total number of possible outcomes
90. Because a flush only requires all cards to be the same suit regardless of rank, while a straight flush requires both same suit and consecutive ranks
Matching (Card Game Strategy & Math): $1 \rightarrow E, 2 \rightarrow C, 3 \rightarrow D, 4 \rightarrow A, 5 \rightarrow B$
91. $B =$ The average outcome you would expect over many repetitions of a decision, calculated by multiplying each outcome's value by its probability and summing
92. $C =$ A strategy that produces the best outcome regardless of what your opponent does
93. $C =$ Mathematician John Nash
94. $B =$ A game where one player's gain exactly equals the other player's loss
95. $A =$ Acting as if you have a stronger or weaker hand than you actually hold to deceive opponents
96. $D =$ Evaluating the potential gains and losses of a decision along with their probabilities before choosing an action
97. If you never bluff, opponents fold whenever you bet big because they know you have a strong hand; if you always bluff, they always call because they know you're likely lying — optimal bluffing keeps opponents guessing
98. Money or resources you've already committed to the pot should not influence your future decisions — only the current expected value of your remaining options matters
99. Chips reduce emotional attachment to money, allowing players to make more

rational mathematical decisions rather than fear-based ones

100. Pot odds compare the current size of the pot to the cost of calling a bet, helping you determine if a call has positive expected value based on your probability of winning
Matching (Card Game Strategy & Math): $1 \rightarrow E, 2 \rightarrow A, 3 \rightarrow D, 4 \rightarrow B, 5 \rightarrow C$
101. C — A mechanic where players start with a small, weak deck and gradually add better cards to it during the game
102. A — Players must carefully allocate limited resources like mana, action points, or cards in hand to achieve their goals
103. A — The system of earning, spending, and exchanging resources within a game that drives player decisions
104. B — Having people play your game to find problems with rules, balance, and fun factor before final publication
105. C — The specific requirement or goal that a player must achieve to win the game
106. D — Ensuring no single strategy, card, or player position is so powerful that it dominates all others, giving all players a fair chance to win
107. Identical starting decks ensure fairness and create a level playing field, while also teaching new players the base mechanics before introducing complex choices
108. A feedback loop is when game events reinforce themselves: positive loops help winning players win faster (rich get richer), which can make games feel one-sided; negative loops help losing players catch up, keeping games competitive
109. The mana curve describes the distribution of card costs in your deck — having cards at various cost levels ensures you can play meaningful cards on every turn rather than having turns with nothing to do
110. Sealed format gives players random cards to build a deck on the spot, testing adaptability and evaluation skills; constructed format lets players bring pre-built decks, testing strategic preparation and metagame knowledge
Matching (Card Game Strategy & Math): $1 \rightarrow D, 2 \rightarrow A, 3 \rightarrow E, 4 \rightarrow C, 5 \rightarrow B$
111. B — China, during the Tang Dynasty (around the 9th century)
112. C — Hearts, diamonds, clubs, and spades
113. A — Bridge (Contract Bridge)
114. A — 1993

115. D — The Joker was added to American decks around the 1860s, originally as the highest trump card in the game of Euchre
116. A — Blackjack (also called Twenty-One)
117. Two colors were cheaper and faster to print than four, and the contrast between red and black provided sufficient visual distinction for gameplay while keeping production costs low
118. Poker evolved from French 'Poque' and German 'Pochen' in early 1800s New Orleans, spread via Mississippi riverboats, was simplified during the Civil War, and gained modern tournament format through the World Series of Poker in 1970
119. Randomized packs create excitement through the surprise of unknown contents, drive repeat purchases as players search for specific cards, and create a secondary market that increases perceived card value and community engagement
120. Mathematics shaped card games through probability theory (developed partly to analyze gambling), combinatorics (card arrangements), and game theory (strategic decision-making), with mathematicians like Pascal and Fermat studying cards specifically
Matching (Card Game Strategy & Math): 1→B, 2→D, 3→A, 4→E, 5→C
121. C — Having 13 cards per suit (Ace through King) provides a wider range of ranks, which creates more variety in gameplay and richer mathematical properties.
122. A — The draw pile is the face-down stack of cards that players draw from during the game.
123. A — You should fan your cards evenly so each card is equally accessible, keeping the game fair and random.
124. C — Rotating the dealer ensures fairness because dealing can provide a slight advantage or disadvantage depending on the game.
125. D — War has no strategy because players have no choices to make — they simply flip their top card each turn.
126. A — The riffle shuffle is actually mathematically effective because research shows 7 riffle shuffles properly randomize a deck, but its quality depends on technique, not appearance.
127. Each player should receive 5 cards when there are 4 players in Go Fish.
128. The player scores 56 points: three Kings at 10 each (30) plus 5 + 6 + 7 + 8 (26).
129. In Go Fish, you only need 4-of-a-kind sets, but in Rummy, you can also form

sequential runs within a suit, adding more strategic options.

130. A valid design would include: dealing cards to players, a turn structure with drawing and playing, a matching mechanic (by suit or rank), a scoring system for successful matches, and a winning condition.
Matching (Scoring Basics): $1 \rightarrow B$, $2 \rightarrow A$, $3 \rightarrow D$, $4 \rightarrow C$, $5 \rightarrow E$
131. D — A standard deck contains exactly 52 cards.
132. B — Turns pass in a clockwise direction around the table.
133. B — You ask for ranks you hold because you need matching cards to form sets, and you can only ask for ranks already in your hand.
134. A — It suggests the Queens are likely in the draw pile rather than in opponents' hands, since two different opponents did not have any Queens to give you.
135. D — Theoretical probability is calculated from known information about the deck, while experimental probability comes from actually performing draws and recording results.
136. D — Parity refers to whether a number is even or odd.
137. You need to win at least 1 more trick to meet your bid of 7, but you should avoid winning too many extra tricks to prevent accumulating sandbag penalties.
138. The metagame is the evolving landscape of popular strategies, dominant deck builds, and counter-strategies that develop within a game's player community over time.
139. Playing high is the dominant strategy because it either ties (if the opponent also plays high) or wins (if the opponent plays low). Playing low can never do better than playing high.
140. Quantum physics is not involved in card tricks. Card tricks use classical mathematics like combinatorics, algebra, and modular arithmetic. Claiming quantum mechanics is a presentation choice, not a mathematical reality.
Matching (Scoring Basics): $1 \rightarrow A$, $2 \rightarrow C$, $3 \rightarrow D$, $4 \rightarrow E$, $5 \rightarrow B$
141. C — Dealing means distributing cards from the deck to each player.
142. D — You could play any heart or any 7 from your hand.
143. D — Probability is a number between 0 and 1 that describes how likely an event is to happen.
144. C — The probability of not drawing a club is $3/4$, because you subtract the probability of drawing a club from 1.

145. B — Replacing the card keeps the deck at 52 cards, so probabilities stay the same. Without replacement, the deck shrinks to 51 cards, changing the probabilities.
146. C — The right volunteer is cooperative and enthusiastic but not attention-seeking, because a difficult or disruptive volunteer can derail the trick and shift audience focus away from the magic.
147. There are 720 different arrangements, calculated as $10 \times 9 \times 8 = 720$ (this is called a permutation).
148. Positive feedback loops make winning players stronger (creating exciting comebacks or decisive endings), while negative feedback loops help losing players catch up (preventing blowouts), and good games balance both.
149. You land on 3, because $7 + 9 = 16$, and $16 \bmod 13 = 3$.
150. Partnerships add a communication challenge where teammates must convey hand information through bidding conventions rather than direct communication.
Matching (Scoring Basics): $1 \rightarrow A$, $2 \rightarrow D$, $3 \rightarrow E$, $4 \rightarrow B$, $5 \rightarrow C$
151. D — Discarding means placing an unwanted card from your hand onto the discard pile, while drawing means taking a new card into your hand.
152. C — Each player places three cards face-down and then flips a fourth card face-up; the higher face-up card wins all ten cards.
153. C — Shuffling randomizes the order of cards so that no player can predict what cards they or others will receive.
154. A — The calculation is slightly off because it double-counts the King of Hearts. The correct answer is $16/52$, since you must subtract the 1 card that is both a heart and a King.
155. A — The probability is $12/49$, because one heart was removed, leaving 12 hearts in a 49-card deck.
156. B — You can observe what suits they played, which cards they avoided, and how confident they seemed, then use that information to make a more informed decision for your own play.
157. A no-randomness game rewards pure skill and strategic preparation, which appeals to competitive players, but it loses the excitement of uncertainty and may feel deterministic and stale for casual players.
158. The iterative design process is a cycle of designing, building a prototype,

playtesting, gathering feedback, and revising the design, repeated many times until the game is polished and fun.

- 159. Both paths have value: sharing freely builds community and gets more players, while selling commercially can fund future designs and validates the game's quality through market feedback, and the best choice depends on the designer's goals.
- 160. Risk versus reward means weighing the potential benefit of a play against the potential negative consequences if it does not work out.
Matching (Scoring Basics): 1→C, 2→E, 3→A, 4→B, 5→D
- 161. It had too many issues to deal with!
- 162. "I'm falling for you!"
- 163. She always knew how to make a great hand!
- 164. Because the teacher said to show their work -- and card tricks always show the whole deck-imal system!
- 165. Because it's outstanding in every suit!
- 166. "I've lost my place -- I'm really out of order!"

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