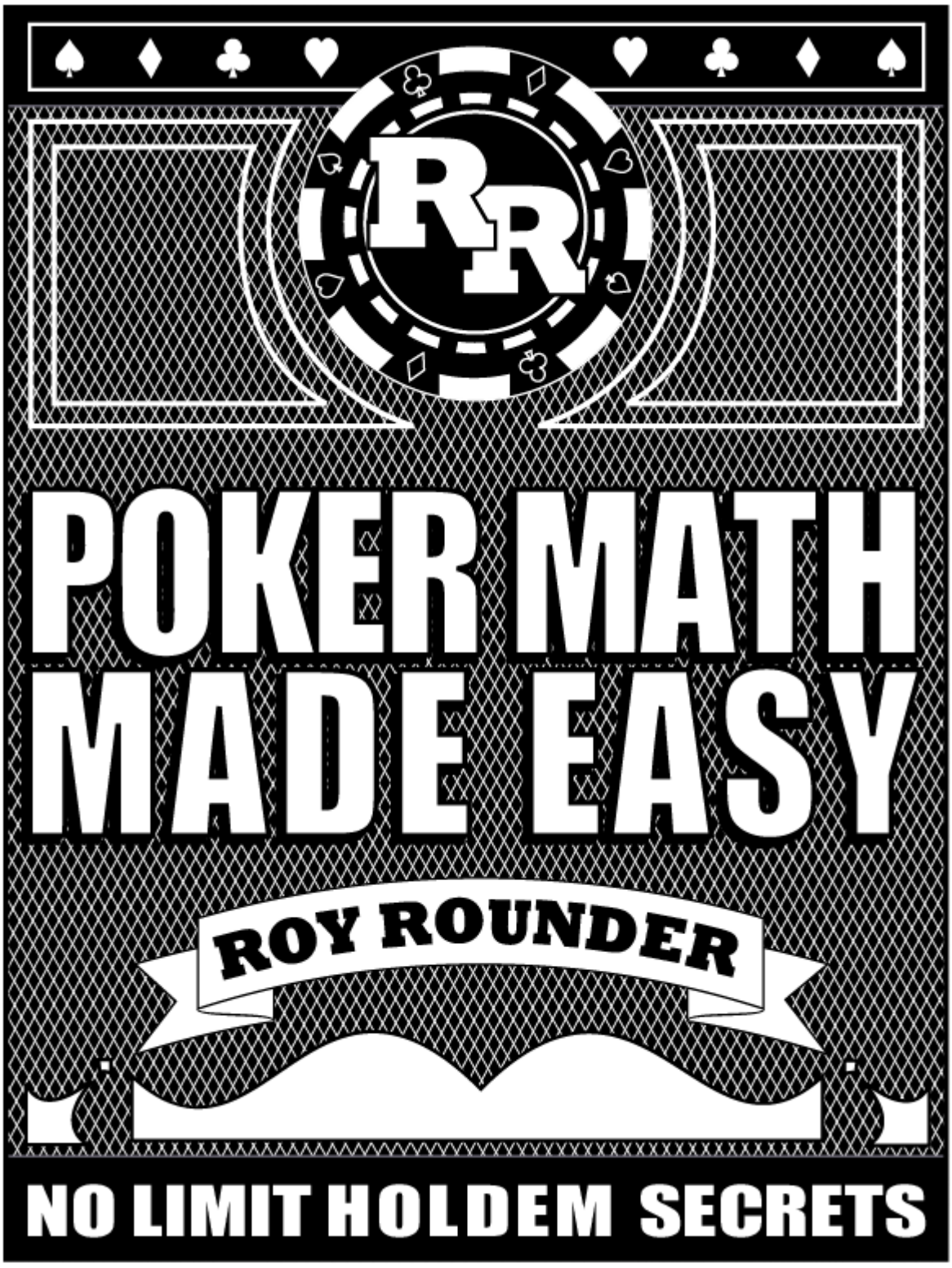
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POKER MATH MADE EASY

BY ROY ROUNDER

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Introduction

Poker math is NOT rocket science.

The basics of calculating poker odds are actually quite simple… and only require knowledge of addition, subtraction, multiplication, and division. If you made it past the 5th grade, you can learn to figure "pot odds" in no time.

Personally, I played no limit Texas Holdem for YEARS without knowing ANY of this stuff. I used my "instincts" when deciding whether or not to stay in a hand.

When I finally learned some poker "math", my skills increased considerably. Not only because I began making better decisions at the table, but because my new skills led to me to new INSIGHTS about the game and how it's played.

Learning odds will expand your poker IQ in a way that makes learning advanced strategies and theory much easier.

But there's a problem.

Up until now, poker odds was only taught by a handful of pros and books, and most of the time it's been explained in a way that's too complex to understand.

No one has brought the world of "poker math" down to an easy, step-by-step format that anyone can learn quickly…

And that's my goal here.

I've done my best to explain the basics of odds calculations for the game of no limit Texas Holdem. Use this information as another tool in your toolbox… in conjunction with the many other strategies and secrets you learned in my book.

When you're done with this, I'd love for you to email me your feedback. If there's enough interest, in the future I might write another book JUST about advanced poker math and theory. I can be reached at roy@royrounder.com.

While reading this report, it's important that you read the sections IN ORDER and ALL THE WAY THROUGH. Each section builds on the previous sections.

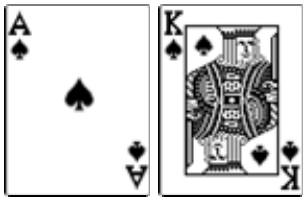
OK, let's get started.

Calculating Outs

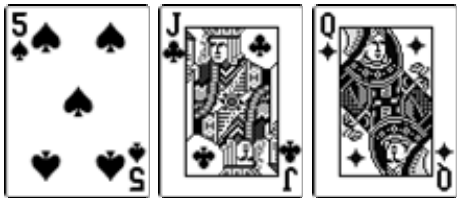
The first step to learning poker math is to learn how to calculate “outs”.

“Outs” are the cards in the deck that can give you a winning hand. They refer to the cards that can hit the board. The more outs you have, the better. The more outs you have, the stronger your hand.

For example… let’s say you’re holding:



The flop comes out:

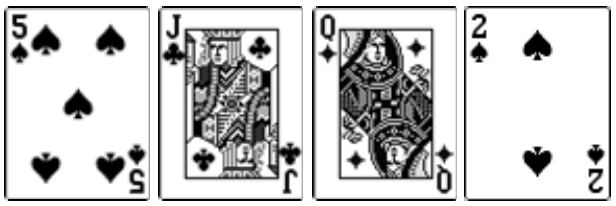


How many outs do you have?

Well, a ten will give you the nut straight… and presumably the best hand. If either a King or Ace hit the board, you’ll have top pair. So those cards can be considered outs as well.

The answer is 3 Aces +3 Kings + 4 Tens (straight draw) =10 Outs.

Now the turn comes and the board looks like this:



NOW how many outs do you have?

Well, now you’re just one spade away from a flush. So you’re number of outs just INCREASED.

The answer is 3 Aces + 3 Kings + 4 Tens + 9 Spades (flush draw) – 1 Ten of Spades = 18 Outs.

Notice that the ten of spades was SUBTRACTED at the end of our calculation. Why? The reason is because we already counted it with the four tens in the deck that would give us the straight.

When calculating odds, never count the same card twice.

OK, so what if someone was holding a Jack and a Queen and had two pair. How would that change things? Well, getting top pair would no longer give you the best hand… which means the three Kings and three Aces in the deck are no longer outs.

This is important.

Outs are ONLY cards that will give you the winning hand.

The question becomes… how do I really KNOW what the winning hand will be?

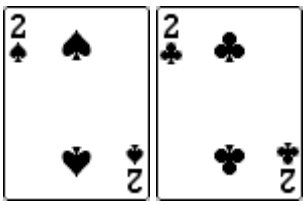
And the answer is you don't.

This is one of the primary limitations of poker odds and calculations… but it's also good because it maintains the unpredictable nature of the game and paves the way for other strategies-- like tells and psychology.

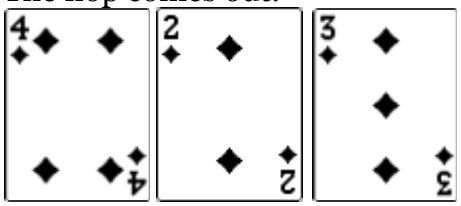
In our example above, if someone bet heavily after both the flop and turn, you might put them on a hand like two pair or three-of-a-kind. In that case, you would only calculate the four tens, the nine spades, and then subtract the ten of spades in order to figure your outs (the answer is twelve).

Obviously, you've got a fantastic hand since you're on BOTH the nut straight draw AND the nut flush draw. This is a rare occurrence, of course.

OK, let's do another example. Say you've got pocket deuces and limp in before the flop.



The flop comes out:



You've hit your trips. But there are a lot of draws on the board for your opponents. There's a flush draw, straight draw, and possible straight-flush draw. All of these hands BEAT yours.

Everyone checks to you. You lead out with a medium bet and get two callers. If someone already made their flush or straight they would probably raise… so you're putting both opponents on draws.

A flush draw at this point has nine outs and a 35% chance of completing. A straight draw has six outs if the player is holding a five… and only three outs if he's holding the Ace.

Remember… a normal open-ended straight draw would have EIGHT outs instead of six. But we must "discount" the Ace of diamonds and five of diamonds, since those would complete the flush draws. (And the flush beats the straight.)

So… all in all there are fifteen cards in the deck that can beat you if one of your opponents is on the open-ended straight draw and one is on the flush draw. There's a 54% chance that one of these hands will hit the board and complete the hand. (We'll go over how I know these percentages a little later.)

BUT… even if one of these hands hit, you still have outs. There's another two in the deck, which would give you a four-of-a-kind. Or the board could pair up, which would give you a full house. Both of these hands would beat a flush or a straight.

All things considered, this is a dangerous hand that can lead to someone losing all their chips. You must be careful, because you can't "expect" your trips to hold up. Especially since someone might have already made their flush or straight.

But at the same time, if you hit quads or a full house, and one of your opponents makes his hand, you're going to win a MASSIVE pot. As we'll discuss later, your "implied odds" are enormous here.

OK, so that's how to calculate outs. Remember that you want to calculate outs AFTER the flop or turn… not when you just know your hole cards. Knowing your outs is the "prerequisite" to figuring out percentages and knowing pot odds.

Of course, knowing your outs in any given situation will become instant to you in no time. After a few poker games of consciously thinking about outs, you'll quickly remember that there are nine outs for a flush draw, eight outs for an open-ended straight draw, four outs from an inside straight draw, and so on.

Calculating Percentages

All right, now you're ready to learn the percentages.

Using the number of outs you have in a situation, you can quickly calculate your PERCENTAGE OF WINNING the hand.

Below is the chart that I use to calculate all the odds at the poker table.

At first, this chart looks pretty intimidating. But once you learn to use it you'll find it to be quick, easy, and efficient. We'll go through each segment of the chart… but for now, I just want you to pay attention to the left side, under the title "Probability".

	Probability			Odds Against		
	Cards To Come			Cards To Come		
	One Card	One Card	Two Cards	One Card	One Card	Two Cards
Outs	(Turn)	(River)	(Turn And River)	(Turn)	(River)	(Turn And River)
1	2.13%	2.17%	4.26%	46.00 to 1	45.00 to 1	22.50 to 1
2	4.26%	4.35%	8.42%	22.50 to 1	22.00 to 1	10.88 to 1
3	6.38%	6.52%	12.49%	14.67 to 1	14.33 to 1	7.01 to 1
4	8.51%	8.70%	16.47%	10.75 to 1	10.50 to 1	5.07 to 1
5	10.64%	10.87%	20.35%	8.40 to 1	8.20 to 1	3.91 to 1
6	12.77%	13.04%	24.14%	6.83 to 1	6.67 to 1	3.14 to 1
7	14.89%	15.22%	27.84%	5.71 to 1	5.57 to 1	2.59 to 1
8	17.02%	17.39%	31.45%	4.88 to 1	4.75 to 1	2.18 to 1
9	19.15%	19.57%	34.97%	4.22 to 1	4.11 to 1	1.86 to 1
10	21.23%	21.47%	38.39%	3.70 to 1	3.60 to 1	1.60 to 1
11	23.40%	23.91%	41.72%	3.27 to 1	3.18 to 1	1.40 to 1
12	25.53%	26.09%	44.96%	2.92 to 1	2.83 to 1	1.22 to 1
13	27.66%	28.26%	48.10%	2.62 to 1	2.54 to 1	1.08 to 1
14	29.79%	30.43%	51.16%	2.36 to 1	2.29 to 1	0.95 to 1
15	31.91%	32.61%	54.12%	2.13 to 1	2.07 to 1	0.85 to 1
16	34.04%	34.76%	56.98%	1.94 to 1	1.88 to 1	0.75 to 1
17	36.17%	36.96%	59.76%	1.76 to 1	1.71 to 1	0.67 to 1
18	38.30%	39.13%	62.44%	1.61 to 1	1.56 to 1	0.60 to 1
19	40.43%	41.30%	65.03%	1.47 to 1	1.42 to 1	0.54 to 1
20	42.55%	43.48%	67.53%	1.35 to 1	1.30 to 1	0.48 to 1
21	44.68%	45.65%	69.94%	1.24 to 1	1.19 to 1	0.43 to 1

The percentage numbers are the probability that you will catch one of your OUTS.

For instance, let's say you're on a club flush draw after the flop. One more club will give you the flush. The number of OUTS you have is nine (since there are thirteen clubs in the deck and you're already using four of them).

To figure your percentage, just take a look at the chart and find the corresponding row and column. The ROW would be the one that says nine outs. The COLUMN would be "One Card (Turn)"… since you know the flop and have the turn card to come.

Probability			
Cards To Come			
	One Card	One Card	Two Cards
Outs	(Turn)	(River)	(Turn And River)
1	2.13%	2.17%	4.26%
2	4.26%	4.35%	8.42%
3	6.38%	6.52%	12.49%
4	8.51%	8.70%	16.47%
5	10.64%	10.87%	20.35%
6	12.77%	13.04%	24.14%
7	14.89%	15.22%	27.84%
8	17.02%	17.39%	31.45%
9	19.15%	19.57%	34.97%
10	21.23%	21.47%	38.39%
11	23.40%	23.91%	41.72%
12	25.53%	26.09%	44.96%
13	27.66%	28.26%	48.10%
14	29.79%	30.43%	51.16%
15	31.91%	32.61%	54.12%
16	34.04%	34.76%	56.98%
17	36.17%	36.96%	59.76%
18	38.30%	39.13%	62.44%
19	40.43%	41.30%	65.03%
20	42.55%	43.48%	67.53%
21	44.68%	45.65%	69.94%

So your percentage chance of getting your flush on the TURN CARD is 19.15%. For the river, it would be 19.57%. This is found by following the same row, but using the next column called “One Card (River)”.

The final number in this row is 34.97%. This is the percentage chance you have of making your flush on EITHER the turn or river. As we’ll learn, this number is NOT as important as you’d think. It’s not used to calculate pot odds.

You might be wondering why the odds for the turn aren’t the same for the river. The reason is because the percentage is the number of outs divided by the number of “unknown” cards. After the turn card comes out, there’s one less “unknown” card, which means the percentage on the river is slightly higher.

You also might be wondering why the turn card column and river card column don’t add up to equal the turn and river card column. For instance, 19.15% plus 19.57% doesn’t equal 34.97%. Why is that?

The answer is related to some complicated math. But for the curious, here's a quick example that makes it easy to remember why…

Pretend you have a coin. You're going to flip it twice, and want to know the odds of making "heads". For the first flip, your odds are 50%. For the second flip, your odds are 50%. But what are the odds you'll make it EITHER the first or second time?

If you add 50% plus 50% you'd get 100%, but obviously that's wrong… since there's always the chance of flipping tails twice in a row.

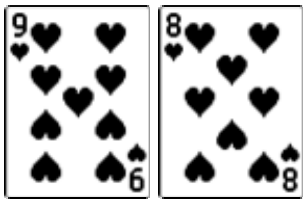
The REAL answer is 75%. This is figured by taking the odds AGAINST making heads for the first flip (1/2) multiplied by the odds AGAINST making odds on the second flip (1/2). That number (1/4) is then subtracted from one to give you ¾, or 75%.

Why is it figured that way?

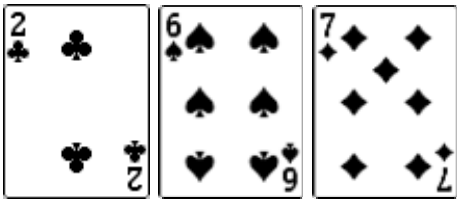
I don't know and I don't want to know. Who cares? It has nothing to do with poker, so let's get back to the percentage charts so that you can win some more pots.

Let's do another scenario for calculating outs and percentages.

You get dealt suited connectors:



The flop comes out:



This gives you two over cards and an open-ended straight draw. You don't put anyone on a pocket pair or two pair yet… so what are your odds of having the "winning" hand on the turn? In other words, what's the percentage you'll make one of your "outs" on the turn?

See if you can figure it out on your own right now.

OK, now for the answer. Step one is to calculate the outs. These are the cards that can help you:

4 fives + 4 tens + 3 nines + 3 eights = 14 outs

The eights and nines are over cards, which means getting one of them will give you top pair. Top pair isn't necessarily a winner, but we'll treat it like a winner for our purposes here.

Now it's time to use the probability charts.

Probability			
Cards To Come			
	One Card	One Card	Two Cards
Outs	(Turn)	(River)	(Turn And River)
1	2.13%	2.17%	4.26%
2	4.26%	4.35%	8.42%
3	6.38%	6.52%	12.49%
4	8.51%	8.70%	16.47%
5	10.64%	10.87%	20.35%
6	12.77%	13.04%	24.14%
7	14.89%	15.22%	27.84%
8	17.02%	17.39%	31.45%
9	19.15%	19.57%	34.97%
10	21.23%	21.47%	38.39%
11	23.40%	23.91%	41.72%
12	25.53%	26.09%	44.96%
13	27.66%	28.26%	48.10%
14	29.79%	30.43%	51.16%
15	31.91%	32.61%	54.12%
16	34.04%	34.76%	56.98%
17	36.17%	36.96%	59.76%
18	38.30%	39.13%	62.44%
19	40.43%	41.30%	65.03%
20	42.55%	43.48%	67.53%
21	44.68%	45.65%	69.94%

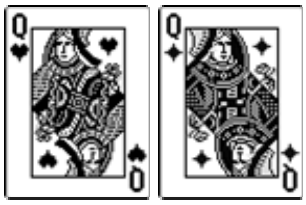
With thirteen outs, you've got a 29.79% chance of making your hand on the turn, a 30.43% for the river, and a total chance of 51.16%.

If you only consider the open-ended straight draw for your outs (and not top pair), you'd have eight outs. That means you'd have a 17.02% chance on the turn, 17.39% chance on the river, and a 31.45% chance for both the turn and river taken together.

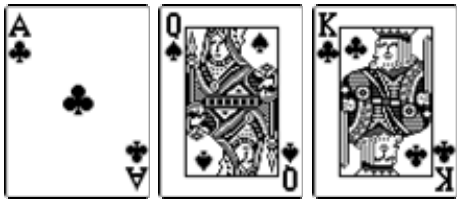
Get it?

OK, let's do one more example. Except this time let's calculate the odds that you'll LOSE a hand… based on your "read" of the opponents at the table.

Let's say you're dealt pocket Queens:



The flop comes out:



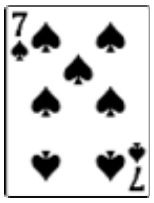
Let's say you pick up a read on your two remaining opponents in the hand. You think one of them has an Ace. You think the other is on a club flush draw.

Using that information, what are the odds your opponents will MAKE their hands (catch their outs) and beat you?

Well, the flush draw has eight outs (the nine remaining clubs minus the Queen of clubs in your hand). Using the percentage charts you'll see that there's a 31.45% chance that opponent will make his hand (on either the turn or river). The other opponent needs a runner-runner situation to stay alive. If another Ace comes out he'll have trips, but that will give you a winning full house.

We'll ignore the runner-runner calculation for now, since it's relatively insignificant. I'll give you the steps to calculating it later.

Ok, so ROUGHLY speaking, you've got a 68.55% chance of winning so far. The turn card comes:

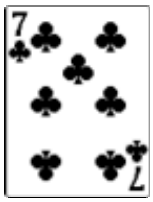


This doesn't help your opponents, but it actually helps YOU. The reason is because now the seven of clubs (which gives your opponent the flush) would pair the board and give

you the full house. Since full house beats a flush, your opponent on the club flush draw has now lost an out. He's down to seven outs.

Using the charts you'll see that means your opponent has a 15.22% chance of winning on the river. That gives you a 84.78% chance of winning.

The river comes out:



Your opponent has the flush so he goes all-in. You call with your full house, Queens full of sevens, and win a monster pot.

OK, so that's how you use the odds percentage charts. These charts are very useful for learning more about probability in poker, and can be used any time you play online poker.

For "offline" poker, these charts aren't quite as useful, since you can't carry them around. At the end of this report, after you learn how to calculate betting odds and make pot odds comparisons, I'll show you the SHORTCUTS for figuring out percentages WITHOUT these charts.

There's a simple, easy shortcut you can use to INSTANTLY know the percentages in your head based on a given number of outs. You'll love it.

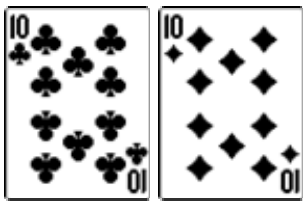
We'll also talk more about why the column for the turn plus river percentage is rarely used in calculating pot odds.

And of course, we'll tie everything together by giving you PRACTICAL applications of all this knowledge.

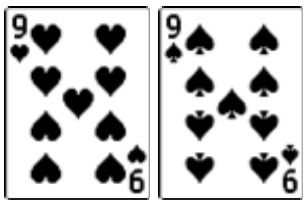
But for now, let's keep working on the "foundation" and go over how to calculate runner-runner odds...

Calculating Runner-Runner Odds

Let's say you get dealt pocket tens:

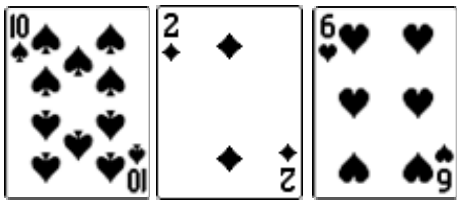


Your opponent is dealt pocket nines:



You make a pre-flop raise and he calls you.

The flop comes out:



You have trips. You make a bet and your opponent goes over the top of you and goes all-in. You call. Everyone's cards are turned over.

Calculating odds here isn't important, since your "control" over the hand is over. But for the sake of example, let's look at your opponent's chances of winning the hand by catching something runner-runner.

We approach this problem by first deciding HOW your opponent can win. He can get two consecutive nines, which would give him quads. He could also catch a seven and an eight, which would give him the straight. Those are the only hands that can save him.

OK, so to get quad nines he needs a nine on the turn AND a nine on the river.

To figure out the math, we use our handy percentage charts. He has two outs on the turn, which equals a 4.26% chance. Assuming he makes that, he has one out left for the river (the other nine). The odds of making one out for the river is 2.17%.

The way to calculate the OVERALL percentage is by MULTIPLYING these two percentages, since they both must occur. This gives your opponent a .0924% chance of winning. That's basically a 1 in 1000 chance.

Now what about the straight draw? The straight is more likely to happen, since there are more cards to hit. There are four sevens and four eights in the deck. That means there are eight outs on the turn card (either the seven or eight). If your opponent makes THAT card, he'll have four outs on the river.

For example, if he hits the seven on the turn, there are four eights left to make on the river.

Using the percentage charts, you can see there's a 17.02% chance of making one of the outs on the turn, and an 8.70% chance of making one of the outs on the river. See below:

Probability			
Cards To Come			
	One Card	One Card	Two Cards
Outs	(Turn)	(River)	(Turn And River)
1	2.13%	2.17%	4.26%
2	4.26%	4.35%	8.42%
3	6.38%	6.52%	12.49%
4	8.51%	8.70%	16.47%
5	10.64%	10.87%	20.35%
6	12.77%	13.04%	24.14%
7	14.89%	15.22%	27.84%
8	17.02%	17.39%	31.45%
9	19.15%	19.57%	34.97%
10	21.23%	21.47%	38.39%
11	23.40%	23.91%	41.72%
12	25.53%	26.09%	44.96%
13	27.66%	28.26%	48.10%
14	29.79%	30.43%	51.16%
15	31.91%	32.61%	54.12%
16	34.04%	34.76%	56.98%
17	36.17%	36.96%	59.76%
18	38.30%	39.13%	62.44%
19	40.43%	41.30%	65.03%
20	42.55%	43.48%	67.53%
21	44.68%	45.65%	69.94%

Once again, we multiply these numbers to figure the chance that BOTH scenarios will happen. The answer is a 1.481% chance that your opponent will catch a runner-runner straight. You can add this to the .0924% chance of a four-of-a-kind. This equals a runner-runner "miracle" chance of 1.573%.

So you're in pretty good shape of winning the hand.

In general, I do NOT make runner-runner calculations at the poker table. It's just not practical, since the number is so small and because it requires so much math.

As a general "rule", you can treat the odds of a runner-runner as about 1%. That seems to be the "average" for many situations. You can decide for yourself whether or not to factor this 1% in your decisions. I don't use it.

OK, so now you know how to calculate outs, how to use the percentage charts, and how to calculate runner-runner situations. Let's look at how to calculate POT SIZE. After this you'll be equipped for real "pot odds" situations.

Calculating Pot Size

Pot size is pretty simple. There are three main considerations:

1. How much money is already in the middle.
2. How much is bet in the current round of betting.
3. How much WILL be bet in the current round.

Let me explain.

Let's say four players (including you) call the big blind of $10 in a game. That puts $40 in the middle.

The flop hits. You're on the button. Drew bets $25 into the pot. Shelly calls. Rick folds. Now the action is to you. What's the current pot size?

The answer is $40 (from the before the flop) added to $25 (from Drew) added to $25 (from Shelly). That equals $90 as the current pot size.

OK, now what if you weren't on the button. Let's say you were second to act…

Four players called the big blind, which puts $40 in the middle. Drew bets $25 and then the action is to you… with two more players BEHIND you left to act. What's the pot size?

The answer is $40 + $25 + UNKNOWN.

Notice these are congruent with the three "considerations" we outlined earlier. So what exactly is "unknown"?

Unknown refers to the two players BEHIND you… who will act AFTER you make your decision. Put simply, you just don't know if those two players will call, raise, or fold. So you really don't know the exact pot size.

This is another fundamental "problem" with odds. Because you don't know the exact pot size, you must "guess" or "infer" what the players behind you will do.

And like I mentioned earlier in the report, this is what makes the game of no limit Holdem fun and exciting… the fact that you CAN'T just base the game on math. The advantage ultimately goes to the most well-rounded players.

OK, so in this situation, you would do your best to get a read on the other players in order to determine pot size.

Now, there's one more tricky part about how to calculate pot size…

A lot of players get confused about whether to count THEIR OWN MONEY in the actual pot size figure. The answer is to include money that's already in there… but not money

you're about to wager. In the example above, you had already called the big blind of $10… so that $10 gets counted.

You were trying to make a DECISION about calling a $25 bet. YOUR $25 bet doesn't get included in the total pot size, because it's not in there yet.

Let's say in our example that you called and the other players behind you folded. So it's just you and Drew heads-up. Now let's say the turn card comes, and Drew bets $50. What's the pot size then?

The answer is $40 (pre-flop) + $50 (after the flop) + $50 (bet on turn from Drew). This time, the $25 you called with after the flop IS included, since now it's officially in the pot. But the $50 you may or may not call with is NOT included… because it's still yours for now.

All right… so that's how to calculate pot size. Now that you know pot size and outs, you're ready to learn "pot odds" and how to APPLY the information you've learned to real-life poker situations.

Calculating Pot Odds

Now it's time to use the RIGHT side of the probability charts we saw earlier. This time we'll be dealing with the "odds against" something happening, which will help you know whether a decision is "justified" according to the odds or not.

Here's the main chart again:

	Probability			Odds Against		
	Cards To Come			Cards To Come		
	One Card	One Card	Two Cards	One Card	One Card	Two Cards
Outs	(Turn)	(River)	(Turn And River)	(Turn)	(River)	(Turn And River)
1	2.13%	2.17%	4.26%	46.00 to 1	45.00 to 1	22.50 to 1
2	4.26%	4.35%	8.42%	22.50 to 1	22.00 to 1	10.88 to 1
3	6.38%	6.52%	12.49%	14.67 to 1	14.33 to 1	7.01 to 1
4	8.51%	8.70%	16.47%	10.75 to 1	10.50 to 1	5.07 to 1
5	10.64%	10.87%	20.35%	8.40 to 1	8.20 to 1	3.91 to 1
6	12.77%	13.04%	24.14%	6.83 to 1	6.67 to 1	3.14 to 1
7	14.89%	15.22%	27.84%	5.71 to 1	5.57 to 1	2.59 to 1
8	17.02%	17.39%	31.45%	4.88 to 1	4.75 to 1	2.18 to 1
9	19.15%	19.57%	34.97%	4.22 to 1	4.11 to 1	1.86 to 1
10	21.23%	21.47%	38.39%	3.70 to 1	3.60 to 1	1.60 to 1
11	23.40%	23.91%	41.72%	3.27 to 1	3.18 to 1	1.40 to 1
12	25.53%	26.09%	44.96%	2.92 to 1	2.83 to 1	1.22 to 1
13	27.66%	28.26%	48.10%	2.62 to 1	2.54 to 1	1.08 to 1
14	29.79%	30.43%	51.16%	2.36 to 1	2.29 to 1	0.95 to 1
15	31.91%	32.61%	54.12%	2.13 to 1	2.07 to 1	0.85 to 1
16	34.04%	34.76%	56.98%	1.94 to 1	1.88 to 1	0.75 to 1
17	36.17%	36.96%	59.76%	1.76 to 1	1.71 to 1	0.67 to 1
18	38.30%	39.13%	62.44%	1.61 to 1	1.56 to 1	0.60 to 1
19	40.43%	41.30%	65.03%	1.47 to 1	1.42 to 1	0.54 to 1
20	42.55%	43.48%	67.53%	1.35 to 1	1.30 to 1	0.48 to 1
21	44.68%	45.65%	69.94%	1.24 to 1	1.19 to 1	0.43 to 1

For our purposes here, we'll only be looking at the RIGHT side this time, under the heading "Odds Against".

The chart works the same way as before. First you figure out how many OUTS you have. Then you compare that to the corresponding column… whether the turn card is about to come or the river card is about to come (or if you want to see BOTH the turn and river cards together).

For example, if you have 14 outs after the flop, it means the odds against you are 2.36 to 1 on the turn and 2.29 to 1 on the river.

Let's look at what "odds against" really MEANS. If the odds against you are 4 to 1 (also written 4:1), that means you will NOT get your card for every four times that you DO get it. It means you'll win one out of five times… or 20% of the time.

A lot of people misconstrue 4:1 to mean ¼, but that's NOT the case. 4:1 equals 1/5. Four times you lose, one time you win. That means you won ONCE out of FIVE times. It's really critical that you "get" this, because it's a fundamental aspect of poker math.

OK, now when you hear the phrase "pot odds", it means the odds you have of making your hand compared with the odds of the betting. The goal is to always be able to "justify" a call according to the odds… assuming all other things are equal.

For example… let's say the odds against you are 4:1 and you must decide whether to call a $5 bet. That means the POT SIZE compared to the BET SIZE should be BIGGER than 4:1. In this case, the bet size is $5, so the pot size would have to be MORE THAN $20 in order to justify a call.

I just covered a lot of ground there, so let me explain.

If the odds are 4:1, and the hand plays out five times, here's what would happen (in terms of probability):

- Lose
- Lose
- Lose
- Win
- Lose

That's in no particular order, of course. Now, if you lost $5 every time that situation occurred, that means you'd lose $20 total for the four losses. Still with me?

With that being said, you want to WIN MORE THAN $20 the one time you win… that way you make a PROFIT. If you win exactly $20, the odds come out even. If you win $21 or more, then the odds are in your favor. If you win $19 or less, the odds are against you.

In poker, you'll encounter situations dozens of times per hour where you'll either get the card or you won't. Over time, everyone's odds come back out to "equal". So that means if you play the odds in your favor consistently, over the long term you'll come out on top.

OK, back to the calculations. With odds against you of 4:1, the "1" represents the time you win, and the "4" represents the times you lose. The "1" represents the BET SIZE that you must make a decision about. In our scenario it's $5. The "4" represents the pot size.

Let's look at a different scenario. Let's say the odds against you winning are 7:1. You've figured the pot size to be $150. Someone made a $20 bet and the action is to you. Are the odds in your favor to call or fold?

The answer is to compare 150:20 to 7:1. Which is bigger? 150:20 is equal to 7.5:1, which is bigger than 7:1. So that means if you played the hand eight times, you'd win once and

lose seven times. That means you'd lose $140 ($20 x 7) but win $150 (the pot size). So you'd come out on top with a net profit of $10. So yes, you should call.

You'll know this QUICKLY by simply figuring out if the BETTING ODDS are bigger or smaller than the HAND ODDS. If the betting odds are bigger, a call is justified. If the betting odds are smaller, the call is not justified.

All right… let's do a quick quiz to test your skills. Here's the "odds against" chart. The questions come right after it with the answers at the end.

	Odds Against		
	Cards To Come		
	One Card	One Card	Two Cards
Outs	(Turn)	(River)	(Turn And River)
1	46.00 to 1	45.00 to 1	22.50 to 1
2	22.50 to 1	22.00 to 1	10.88 to 1
3	14.67 to 1	14.33 to 1	7.01 to 1
4	10.75 to 1	10.50 to 1	5.07 to 1
5	8.40 to 1	8.20 to 1	3.91 to 1
6	6.83 to 1	6.67 to 1	3.14 to 1
7	5.71 to 1	5.57 to 1	2.59 to 1
8	4.88 to 1	4.75 to 1	2.18 to 1
9	4.22 to 1	4.11 to 1	1.86 to 1
10	3.70 to 1	3.60 to 1	1.60 to 1
11	3.27 to 1	3.18 to 1	1.40 to 1
12	2.92 to 1	2.83 to 1	1.22 to 1
13	2.62 to 1	2.54 to 1	1.08 to 1
14	2.36 to 1	2.29 to 1	0.95 to 1
15	2.13 to 1	2.07 to 1	0.85 to 1
16	1.94 to 1	1.88 to 1	0.75 to 1
17	1.76 to 1	1.71 to 1	0.67 to 1
18	1.61 to 1	1.56 to 1	0.60 to 1
19	1.47 to 1	1.42 to 1	0.54 to 1
20	1.35 to 1	1.30 to 1	0.48 to 1
21	1.24 to 1	1.19 to 1	0.43 to 1

Circle "J" for a justified call, or "U" for an unjustified call. (Ignore "implied odds" if you're familiar with them.)

1. A $2 bet on the turn (river card is left) with a $12 pot when you have 7 outs:

J U

2. A $4 bet with an $8 pot after the flop when you have 8 outs:

J U

3. An opponent moves all-in after the flop for 275 chips making the pot 500 while you have an inside straight draw and the nut flush draw.

J U

(Hint: You have 12 outs.)

4. A $10 bet after the flop with a $65 pot when you have an inside straight draw.

J U

…
…
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…
…
…
…

Here are the ANSWERS…

(1. J 2. U 3. J 4. U)

How'd you do?

If you had trouble with these, just email me at roy@royrounder.com and I'll email you an explanation of each. But I'll assume you aced them all for now.

OK, so now you understand how to use "odds against" to calculate pot odds. We're going to get back to pot odds soon. But now it's time to talk about implied odds, discounting odds, and other related factors to consider in a hand…

Calculating Implied Odds

Put simply, implied odds has to do with the "extra" amount of money you stand to win if you complete your hand (make your outs).

We'll start with an example. Let's say you're on the flush draw after the turn and have a 20% of making a winning hand (4:1). Your opponent has two pair. The action is to you to call a $20 bet. There's a pot size of $70.

In terms of "explicit odds" (what we've been doing so far), you know that in order make a justified call there needs to be at least $80 in the pot… but there's only $70.

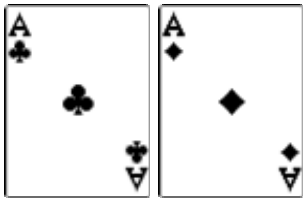
But in this situation, your opponent has been betting aggressively the entire hand. You're confident that he'll bet again after the river no matter what hits… and that you'll be able to even RAISE him for more money.

You figure you can get at least another $30 from your opponent if you hit your flush. So you add this "implied value" to the current pot size… and see that it's worth calling now.

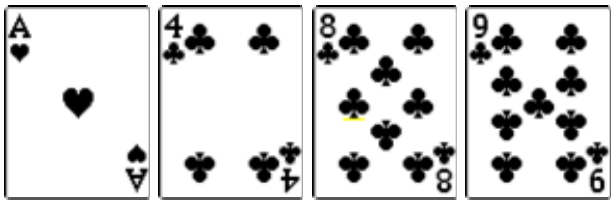
That's how implied odds work. There's no "math" to them, because they're based on your intuition. They aren't present in every hand situation—just the ones where you have a "hidden" hand or your opponent is too pot-committed, etc. Considering implied odds requires that you have a read on your opponents and can roughly deduce what they're holding.

The implied value of an out is up to you. The great thing about no limit Holdem is that often the implied value is DOUBLING UP. If you hit a hidden hand on the river, you can get your opponent to call an all-in bet and take every single last one of his chips.

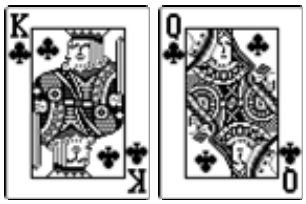
For instance, here's a cool scenario. Let's say you've got pocket Aces:



The board reads:



Your opponent has:



That means your opponent has the flush and you have trip aces. There's just one river card left to go. Your opponent (who is chip leader) bets $2,800 into a $800 pot.

You have lots of outs here. There's:

1 ace + 3 fours + 3 eights + 3 nines + 7 clubs left = 20 outs

The fours, eights, and nines give you a full house. The other club would give you the nut flush. With twenty outs, the explicit odds STILL don't quite justify a call. But you know that if you DO get your full house or nut flush, you'll be able to move the REST of your chips into the middle and double up.

You'd factor a lot of different things into this type of decision, including the implications of LOSING all your money (Is it a tournament or cash game? Are there re-buys?), how big your chip stack is, how many players are at the table, and so on.

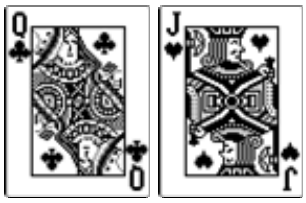
This is an extreme example, but it shows the importance of implied odds. Most all-in decisions are made according to implied odds, which is part of the reason why the behavior from one card player to the next is so different.

All right, let's move on to "discounted odds".

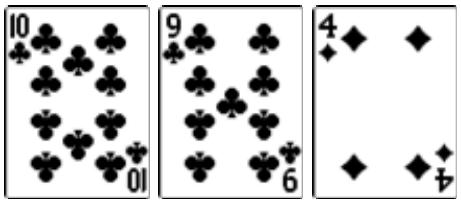
Calculating Discounted Odds

Calculating the number of outs in order to make a hand is rather easy. But a problem arises when one of YOUR outs is also one of your OPPONENT'S outs. This changes the calculation considerably.

For example, let's say you're holding:

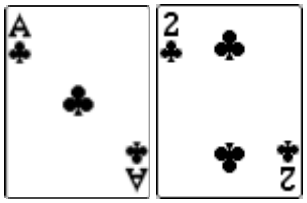


And let's say the flop reads:



You have an open-ended straight draw. Normally, that means you have eight outs.

However, let's say you put your OPPONENT on a club flush draw. Let's say he's holding:



That means if an eight of clubs or a King of clubs hits the board, your opponent will have the FLUSH and you'll have the straight. Since OUTS refers to cards that can give you the WINNING HAND, the eight and King of clubs are no longer "outs" for you… since they give you a losing hand.

This information brings the number of outs down to six.

This concept is called "discounted odds", because you're DISCOUNTING cards that will help someone else's hand.

Now, of course, you don't necessarily KNOW if someone has the club draw in our example, but based on a player's betting patterns and history of play you might be able to INFER that he does. This type of decision making is where the ability to READ players meets with the ability to do poker math.

One of the important parts of discounting relates to how many players are at the table. Let's say you're sitting at a 10-man table and five players see the flop. Well, this unusually high number of players would suggest that at least one or two… quite possibly more… of the Aces are in other players' hands.

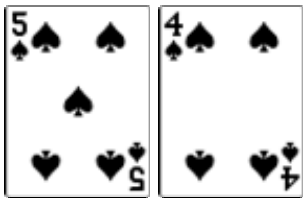
If you need an Ace as one of your "outs", it would be smart to DISCOUNT a couple of them from your calculation. Instead of saying you have four outs (for all four aces), you'd calculate the number with one or two outs… since "common sense" tells you that other players have some Aces.

Once again, there's no science to this. You've got to combine your feel for the players and the table with your odds calculations in order to use discounted odds.

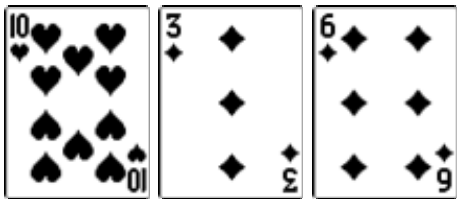
Miscalculating Odds

There are three main MISTAKES players make when it comes to odds for no limit Texas Holdem. The first is simply miscalculating the OUTS.

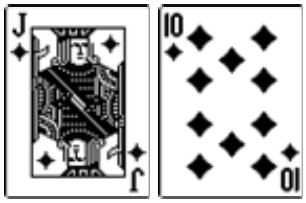
For example, let's say you've got an open-ended straight draw and you're certain your opponent has a flush draw. You're holding:



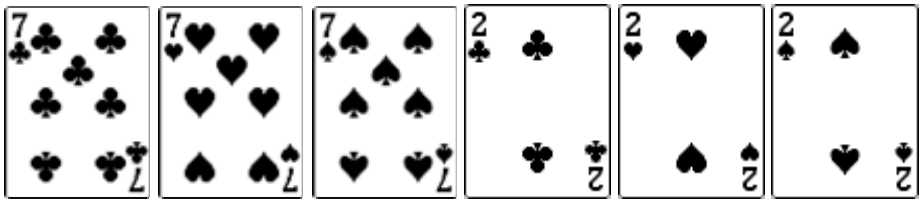
The flop reads:



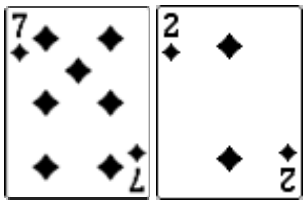
Your opponent has:



Normally here you would have eight outs, since you have an open-ended straight draw. But since you put your opponent on the flush, you discount the two of diamonds and the seven of diamonds. That means you have six outs:



Discounted cards:



Now here's what's surprising. Just discounting those TWO outs can amount to saving THOUSANDS of dollars when making your poker decisions…

For a normal open-ended straight draw, you'd have a 31.45% chance of getting an out. However, with the flush draw on the table, you only have a 24.14% chance.

Let's say you run into this situation three times per game, about four times per week. That's twelve times per week. Say you lose an average of $10 per missed draw, and win $25 profit from every completed draw.

After about two months, you would have seen this situation 100 times. Without discounting your outs (making a bad calculation), you would expect to win about 32 times (since your odds are 31.45%… rounded up for runner-runner situations).

If you calculate the fact that you'll win $25 profit per win, that equals $800. If you lose 68 times (for the missed draws), you'd lose $680. That means you expect to make a profit of $120 in the two months. It's worth it, right?

Now if you calculate the REAL odds, however, you will find a much different story. Let's crunch some numbers…

With six outs (instead of eight), you'd have a 24.14% chance of winning. After 100 hands, you'd win 25 times, which equals $625 in profit. But you'd lose 75 times, which is a loss of $750.

That means you'd LOSE $125 total… rather than MAKE $120 total… after two months of play. That's a BIG DIFFERENCE, considering we're talking about very low stakes. And we're only talking about ONE specific situation.

Think about all the OTHER outs miscalculations that can happen… and the implication of all those mistakes COMBINED. It's really no wonder so many guys go broke at the poker tables.

Remember, if you're going to make informed poker math decisions, you must be sharp. You must remember to discount outs when possible, not count the same card twice, and look for all "outs" possibilities within a given situation.

OK, now let's take a look at the second mistake I often see players make. It is comparing betting odds of ONE round of betting with the TURN PLUS RIVER odds of the hand.

Remember, when calculating pot odds you must pay attention to the probability of getting an "out" on the NEXT card… NOT on the next two cards.

Every round of betting is INDEPENDENT of the other rounds. That's why I said earlier in this report that the column on our chart that says "Turn And River" isn't used to calculate pot odds.

If the action were to you to call a $20 bet with a $100 pot size, you'd need to be getting better than 5:1 on your hand.

Let's say you have six outs. That means the odds of making your hand on the turn is 6.83:1 and the odds on the river is 6.67:1. The odds of making your hand on EITHER the turn or river is 3.14:1.

3.14:1 is better than 5:1. So does that mean you should call the bet?

NO! Absolutely not.

Here's why: Because the $20 bet is JUST for the turn card… not the turn and river. The number to pay attention to is 6.83:1, which isn't good enough to justify a call. So you should fold.

Think about it… after the turn hits, your opponent is going to bet AGAIN. And this time the bet will probably be HIGHER. If he bets $40 into a $140 pot, you're forced to make another decision in order to see the river card. And if you call that, then you've just spent a total of $60 to see both the turn and river… rather than $20. And that's why the 3.14:1 stat is irrelevant.

So now the question becomes… Can you EVER use the odds figure of making your hand on EITHER the turn or river?

The answer is yes. The number can be used when making an ALL-IN decision after the flop.

For example, if you have a lot of draws after the flop and someone goes all-in, you can use the odds of making your outs on EITHER the turn or river in order to make a decision to call.

But besides those cases, you should focus only on the odds of making your hand for one specific round of betting. Period.

The third big mistake I've seen regarding odds is USING THEM AT THE WRONG TIME.

This is critical.

You see, a lot of amateurs and “fish” out there make DUMB decisions at the poker table. When you encounter one of these players, you’ll want to make YOUR decisions based on your read of the situation more than the “odds” of winning.

For example, if someone has played extremely tight the entire game and comes out betting aggressively after the flop, you can put that player on a monster. Even if “odds” dictate a call in your position, you should probably just fold the hand and live to see another day.

It’s the same way with overly-aggressive players. Even though the pot odds might dictate folding, sometimes a call will be a better play.

It all depends on the players you’re up against. I’ve said it a million times: poker math is a TOOL, nothing more. Odds are not meant for every situation… and you can’t rely on them too much, especially in no limit Texas Holdem.

Shortcuts For Calculating Odds

OK, so now you know the details of "poker math" and how to calculate pot odds… while also taking implied odds and appropriate adjustments into consideration.

Up until this point we've been using the CHARTS as our source of data. Now I want to teach you how to use the odds WITHOUT charts… and without complicated calculations. This will give you the power to understand in-depth poker math IN YOUR HEAD… without being a math genius.

OK, let's get started.

First off, let me show you a neat shortcut, based on the percentage charts. Here is the chart again:

Probability			
Cards To Come			
	One Card	One Card	Two Cards
Outs	(Turn)	(River)	(Turn And River)
1	2.13%	2.17%	4.26%
2	4.26%	4.35%	8.42%
3	6.38%	6.52%	12.49%
4	8.51%	8.70%	16.47%
5	10.64%	10.87%	20.35%
6	12.77%	13.04%	24.14%
7	14.89%	15.22%	27.84%
8	17.02%	17.39%	31.45%
9	19.15%	19.57%	34.97%
10	21.23%	21.47%	38.39%
11	23.40%	23.91%	41.72%
12	25.53%	26.09%	44.96%
13	27.66%	28.26%	48.10%
14	29.79%	30.43%	51.16%
15	31.91%	32.61%	54.12%
16	34.04%	34.76%	56.98%
17	36.17%	36.96%	59.76%
18	38.30%	39.13%	62.44%
19	40.43%	41.30%	65.03%
20	42.55%	43.48%	67.53%
21	44.68%	45.65%	69.94%

As you know, it's not really necessary to know the EXACT percentage. For instance, 2.13% can be considered 2%, 6.38% can be considered 6%, 27.66% can be considered 28%, etc. for all practical purposes.

With that being said, you'll notice that you can find the percentage by DOUBLING THE OUTS and adding ONE. The "formula" looks like this:

(OUTS X 2) + 1 = % of getting a card you need

That formula works anytime you have between three and eleven outs. If you have FEWER than three outs, it doesn't really matter… since you should fold anyway. And if you have MORE than eleven outs, you've got great odds and will probably call (or raise).

To be exact, here are the formulas to cover the possibilities…

1-3 Outs: Outs x 2 = % of hitting

3-11 Outs: (Outs x 2) + 1 = % of hitting

12+ Outs: (Outs X 2) + 2 = % of hitting

For instance, let's say you pick up an open-ended straight draw and have eight outs. Instead of using the chart to find the percentage chance of hitting on the turn (17.02%), you can simply do it in your head. All you do is multiply eight by two and add one, which equals seventeen.

(8 outs x 2) + 1 = 17%

Simple huh?

This is a very powerful strategy. For most real-life poker situations, you will have between three and eleven outs. And in most real-life poker situations you definitely won't have access to any charts. This makes the simple "double the outs and add one" technique easy-to-remember and quite efficient.

Of course, now the question becomes: How can this be used for POT ODDS?

As we discussed earlier, pot odds are found by comparing the hand odds in X:X format versus the betting odds in X:X format. If you're getting lots of money for a little investment, then a call is justified. To be exact… if the betting odds number is BIGGER (when in X:1 format), you should call. If it's smaller, you should fold.

For example…

If you're getting 4:1 on your money and 2:1 on your hand, a call is JUSTIFIED.

If you're getting 4:1 on your money and 8:1 on your hand, a call is UNJUSTIFIED.

OK, but now we have a problem. Before, we were using the charts for the X:X number… under the "odds against" column. How can we do the odds IN OUR HEAD and still use the SHORTCUT method we just discussed?

The solution is to CONVERT THE BETTING ODDS TO A PERCENTAGE. There are a few different solutions actually, but this is fastest and easiest.

What I mean is… instead of comparing everything in X:X format, we'll start comparing everything in terms of percentages.

All right, let's look at how to calculate the "betting percentage"…

We need the same two numbers as before: pot size and bet size. Before, we compared the numbers like this:

Pot Size: Bet Size

So if there was $100 in the pot and the action was to you to call a $20 bet, the figure would be 100:20, or 5:1.

Now all we want to do is CONVERT THAT into a PERCENTAGE. It's actually very easy. All we do is DIVIDE THE BET SIZE by the POT SIZE ADDED TO THE BET SIZE. The formula looks like this:

Bet Size / (Pot Size + Bet Size)

In our example before, the bet size was $20 and the pot size was $100. Plugging that into our formula…

20 / (100 + 20)

Which equals…

20/120

Which equals

1/6

You'll notice that 5:1 can be converted to 1/6 fairly easily. All you have to do is add five and one and make it the bottom part of the fraction. This is just another way to say the same thing as what we just did.

Then, your job is to know what 1/6 equals. This is the "hardest" part. If you're terrible at math, you can brush up on basic fraction percentages here:

1/2 = 50%
1/3 = 33%
1/4 = 25%
1/5 = 20%
1/6 = 16.5%
1/7 = 14%
1/8 = 12.5%

1/9 = 11%
1/10 = 10%
1/11 = 9%
1/12 = 8%

So for our example, we can see that 1/6 equals 16.5%.

The next step is to simply compare the BETTING PERCENTAGE with our HAND ODDS percentage. The hand odds are figured using the shortcut we just learned.

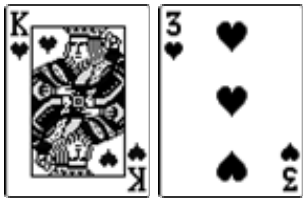
If the hand odds percentage is bigger than the betting percentage, a call is justified. If not, a call is unjustified.

Hand % > Betting % Call is justified.

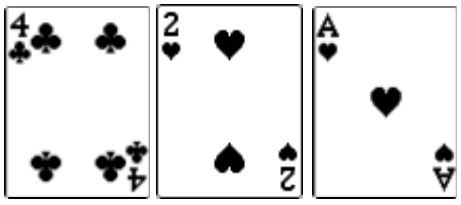
Hand % < Betting % Call is unjustified.

All right, you're ready for a real-life example…

You get dealt:



The flop hits:



That means you have the nut flush draw with your four hearts.

You're on the button. There's $80 in the pot from before the flop. Sally bets $40 after the flop and three players call. The action is to you.

First, you calculate the pot size. It equals $240. You need to decide whether a call is justified or not. You have nine outs (since there are thirteen hearts in the deck and you already see four of them).

Plugging the nine outs into our formula…

(9 x 2) + 1 = 19%

If we were using the chart we'd see the actual percentage is 19.15%.

Now you must find the betting percentage. Since the pot size is $240 and the bet size is $40, we plug these numbers into our formula…

40 / (240+40) = 40/280 = 1/7

Now we just need to decide is 1/7 is bigger or smaller than 19%. Well, 19% is about 20%. So is 1/7 bigger or smaller than 20%? The answer is smaller.

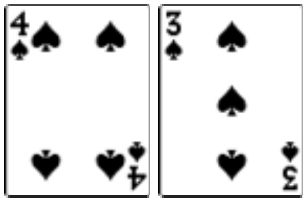
That means that a call IS justified.

Of course… we haven't considered other factors in our example here. Since there were so many players in the hand, we would have DISCOUNTED a couple of the outs, since someone else was probably on the flush draw. BUT, we would have also considered the IMPLIED ODDS of busting someone else's flush with our "nuts".

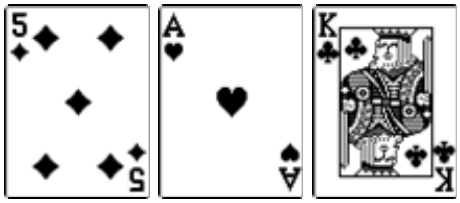
So all in all, a call is a good decision to make either way you look at it.

Let's do another example:

Say you get dealt:



The flop hits:



You've got an inside straight draw (you need a two).

Let's say the pot size is $100 and the betting amount is $20. Should you call or fold?

Well, since there are four twos in the deck, you know that you have four outs. After doubling that and adding one you have a 9% chance of making your straight on the turn.

Now you just need to decide if the betting percentage is larger or smaller. Divide 20 by (100 + 20). The answer is 20/120, or 1/6. You know that equals about 16.5%... so it's LARGER than 9%. That means your hand percentage is SMALLER.

Remember...

Hand % > Betting % Call is justified.

Hand % < Betting % Call is unjustified.

So in this case, you should FOLD.

A lot of this will become instinctual and "second nature" very soon. As you become familiar with these types of calculations, you'll understand that inside straights are hardly EVER worth chasing. It's the same way with staying in a hand just because you have one overcard... it's just not worth it.

Let's summarize the pot odds calculations one more time in this easy three-step process:

1. Double your outs and add 1. This equals your approximate percentage of making your hand. (Your "hand odds percentage".)

2. Divide the bet size by the pot size added to the bet size. (This equals your "betting percentage".)

Bet Size / (Pot Size + Bet Size)

3. Compare the "hand odds percentage" to the "betting percentage". If the hand odds are higher, a call is justified. If the hand odds are smaller, a call isn't justified.

All that's left is to consider your implied odds, discounted odds, and make adjustments according to the players you're up against. If anything extreme sticks out (i.e. drawing for the nuts, up against a rare playing style, etc.), then you should factor that into your decision.

Conclusion

OK, that wraps up POKER MATH MADE EASY.

If you have any specific questions about the examples or numbers in this report, please email me at roy@royrounder.com.

Like I said, poker math is a great tool to learn and use at the appropriate times. Combine this knowledge with the other strategies and techniques you've learned to win MORE POTS and MORE CASH at the poker tables.