Calculate the chance of winning in a two-candidate race with no undecided.

Candidate percentages are based on random samples with sampling error
Sampling error is determined by sample size & confidence level.
Per statistical theory, sampling distribution is always Normal.
In this case, the two distributions are perfectly symmetric relative to 50%.
Sampling just one automatically generates the other.

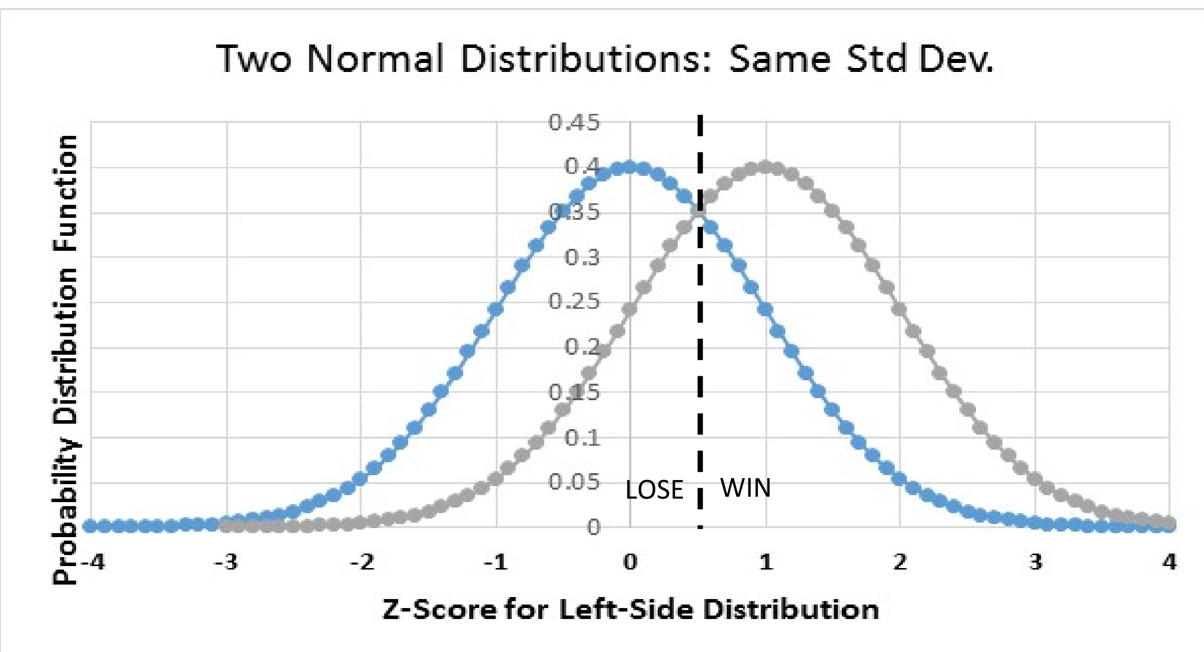
For any amount of separation, there is just one point at which
1) the probability of being above that point for the higher-score distribution
equals the complement of
2) the probability of being above that point for the lower-score distribution.

That point is the value at which the two distributions intersect.

In this particular case, the separation between the means is one standard deviation.
The point of interesection is at 0.5 standard deviations.

Z = +0.5 for the left-side distribution.	0.5	30.9%	=1-NORM.S.DIST(F17,1)
Z = -0.5 for the right-side distribution.	-0.5	69.1%	=1-NORM.S.DIST(F18,1)
	Total	100.0%	

If the separation is one standard deviation, the chance of winning is
69% for the candidate having the higher average score.
31% for the candidate having the lower average score



Generate the relationship between

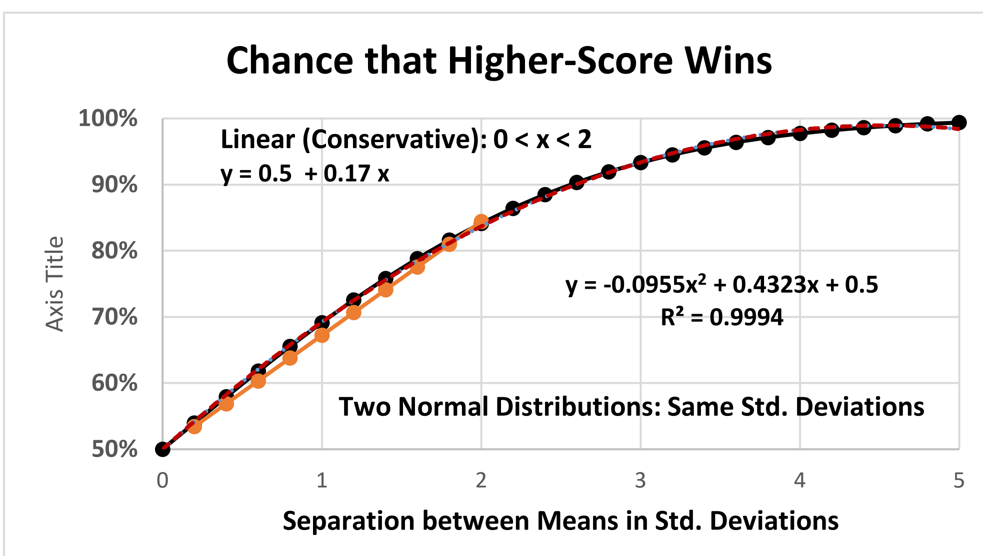
1) the percentage of the vote obtained by the candidate with the higher score,
1) the separation between the two percentage of the vote for the two candidates, and
3) the chance of winning for either candidate

Z = Half the Separation measured in Standard Deviations
Chance lower-score candidate looses = chance higher-score candidate wins

Linear fits to the lower left-end of the range

OLS Slope	0.1722	=SLOPE(B67:B77,A67:A77)	
Slope1	0.1706	=(0.8413 - 0.50)/2	P1: More conservative
Slope2	0.1700	=(0.84 - 0.50)/2	P2: Simplest, most conservative

		0.9953873	0.9953873	0.9953873	R^2
		0.1722	0.1706	0.1700	Slope
Separation	Pwin	OLS	P1	P2	
0	50.0%	0.500	0.500	0.500	
0.2	54.0%	0.534	0.534	0.534	
0.4	57.9%	0.569	0.568	0.568	
0.6	61.8%	0.603	0.602	0.602	
0.8	65.5%	0.638	0.636	0.636	
1	69.1%	0.672	0.671	0.670	
1.2	72.6%	0.707	0.705	0.704	
1.4	75.8%	0.741	0.739	0.738	
1.6	78.8%	0.776	0.773	0.772	
1.8	81.6%	0.810	0.807	0.806	
2	84.134%	0.844	0.841	0.840	
2.2	86.4%				
2.4	88.5%				
2.6	90.3%				
2.8	91.9%				
3	93.3%				
3.2	94.5%				
3.4	95.5%				
3.6	96.4%				
3.8	97.1%				
4	97.7%				
4.2	98.2%				
4.4	98.6%				
4.6	98.9%				
4.8	99.2%				
5	99.4%				

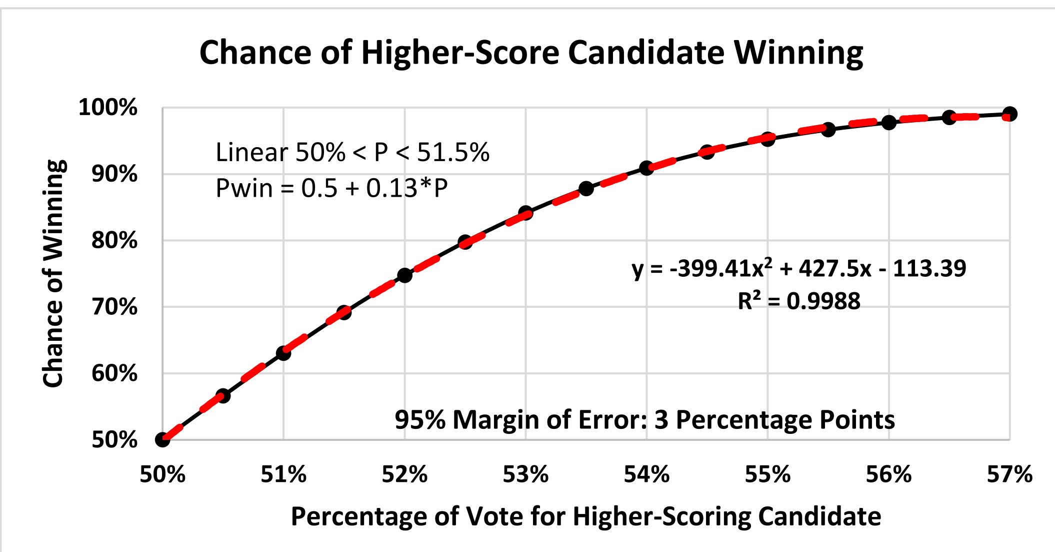


Generate the relationship between

1) the percentage of the vote obtained by the candidate with the higher score,
2) the standard deviation for each of these distributions, and
3) the chance of winning for either candidate

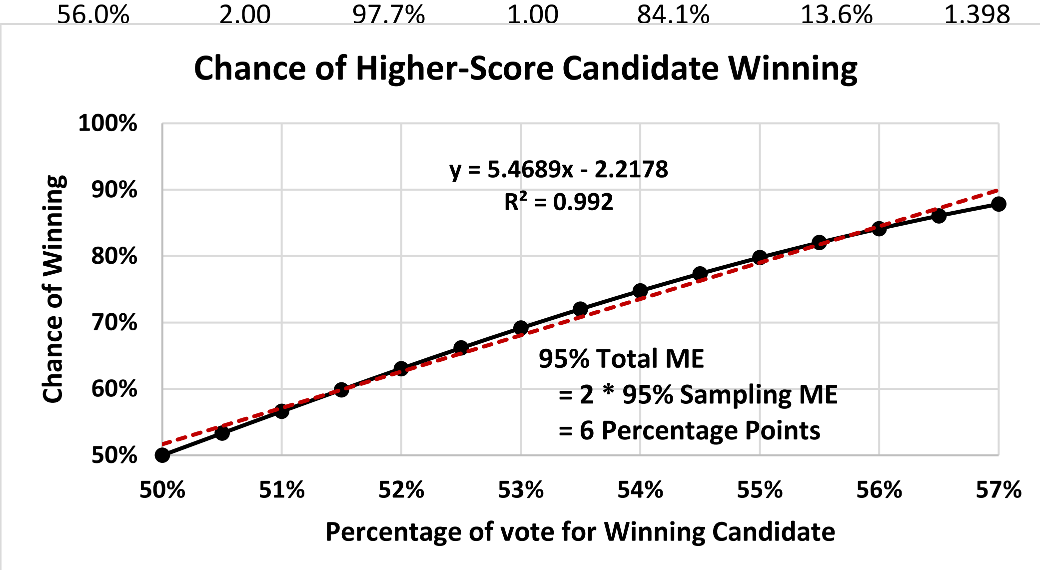
P1 = percentage of the vote for the candidate with the lower score
P2 = percentage of the vote for the candidate with the higher score
Separation = P2 - P1
SD = the standard deviation of the sampling distribution for either candidate
Z = (P2-.5) / SD = (P2-0.5)/SD = (P2-0.5) / [1/sqrt(n)] = (P2-0.5)*Sqrt(n)

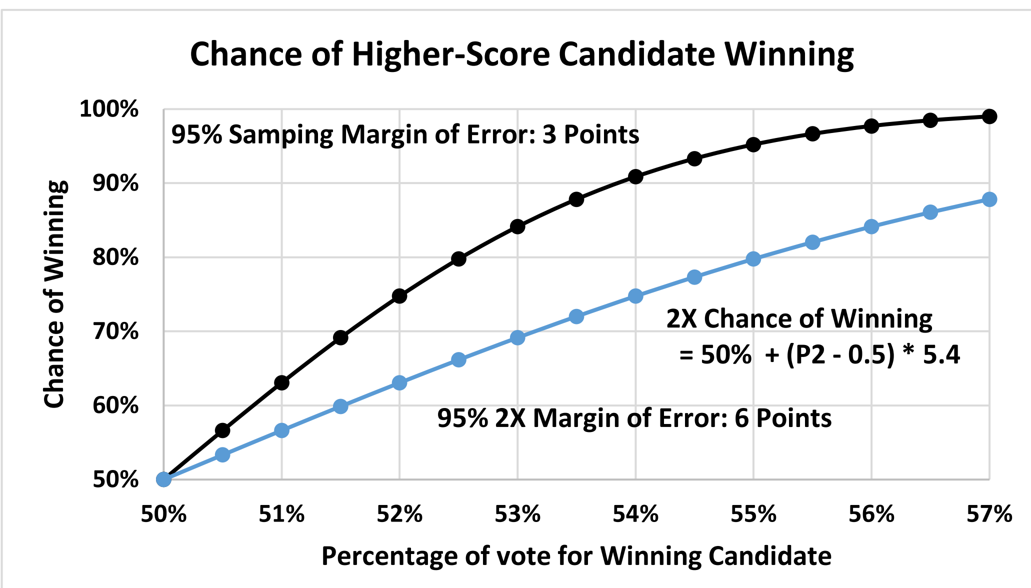
	3%	95% Margin of error				
		ME = 1/Sqrt(n)		Sqrt(n) = 1/0.03		n = (1/0.03)^2
		1,111.1 =(1/0.03)^2				
A	B	C	D	E	F	G
110	P2	Z	Chance of lower-score candidate loosing due to sampling error			
110	50.0%	0.00	50.0%	D111 =NORM.S.DIST(C111,1)		
110	50.5%	0.17	56.6%	C111 =(B111-0.5)/B$106		
110	51.0%	0.33	63.1%			
	51.5%	0.50	69.1%			
	52.0%	0.67	74.8%			
	52.5%	0.83	79.8%			
	53.0%	1.00	84.1%			
	53.5%	1.17	87.8%			
	54.0%	1.33	90.9%			
	54.5%	1.50	93.3%			
	55.0%	1.67	95.2%			
	55.5%	1.83	96.7%			
	56.0%	2.00	97.7%			
	56.5%	2.17	98.5%			
	57.0%	2.33	99.0%			



Generate the chance of winning assuming Total ME = Twice Sampling ME

			Chance of lower-score candidate loosing due to sampling error			
P2	Z		Due to Total Error		Difference	Ratio
50.0%	0.00	**50.0%**	0.00	**50.0%**	0.0%	#DIV/0!
50.5%	0.17	**56.6%**	0.08	**53.3%**	3.3%	1.993
51.0%	0.33	**63.1%**	0.17	**56.6%**	6.4%	1.973
51.5%	0.50	**69.1%**	0.25	**59.9%**	9.3%	1.940
52.0%	0.67	**74.8%**	0.33	**63.1%**	11.7%	1.896
52.5%	0.83	**79.8%**	0.42	**66.2%**	13.6%	1.843
53.0%	1.00	84.1%	0.50	**69.1%**	15.0%	1.783
53.5%	1.17	87.8%	0.58	**72.0%**	15.8%	1.718
54.0%	1.33	90.9%	0.67	**74.8%**	**16.1%**	1.652
54.5%	1.50	93.3%	0.75	**77.3%**	16.0%	1.585
55.0%	1.67	95.2%	0.83	**79.8%**	15.5%	1.519
55.5%	1.83	96.7%	0.92	82.0%	14.6%	1.457
56.0%	2.00	97.7%	1.00	84.1%	13.6%	1.398





Chance of Higher Winning = 50% + (P2-50%)*37.8/7 5.4 =37.8/7 Conservative