



# EXAMPLES



## Definition

Probabilities of 3-0 / 3-1 / 3-2 / 2-3 / 1-3 / 0-3	P1 / P2 / P3 / P4 / P5 / P6
Normal distribution with average 0 and standard deviation 1	~N(0,1)
Strength difference between the teams	$\Delta$
Standard scaling factor	8
Teams World Ranking scores	WRS1 / WRS2
The cut-points in the normal distribution that represent the average outcome of a match between two equal strength opponents derived from the actual match results of the past decade	C1 / C2 / C3 / C4 / C5
Expected Match Result	EMR
Set Score Variant	SSV
Match Weight Factor	MWF

## FICTIOUS MATCHES EXAMPLES AND IMPACT ON WORLD RANKING SCORES

Before the match at the FIVB Volleyball World Cup, Brazil is ranked number 1 with a 415 WR score and Japan is ranked number 11 with a 192 WR score.

$$\Delta = 8 * (WRS1 - WRS2) / 1000 = 8 * (415 - 192) / 1000 = 1.784$$

$$C1 = -1.060$$

$$C2 = -0.394$$

$$C3 = 0$$

$$C4 = 0.394$$

$$C5 = 1.060$$

$$P1 = \text{Probability of } \mathbf{3 - 0} \text{ result} = \sim N(0,1)(C1 + \Delta) = 76.5\%$$

$$P2 = \text{Probability of } \mathbf{3 - 1} \text{ result} = \sim N(0,1)(C2 + \Delta) - \sim N(0,1)(C1 + \Delta) = 15.2\%$$

$$P3 = \text{Probability of } \mathbf{3 - 2} \text{ result} = \sim N(0,1)(C3 + \Delta) - \sim N(0,1)(C2 + \Delta) = 4.5\%$$

$$P4 = \text{Probability of } \mathbf{2 - 3} \text{ result} = \sim N(0,1)(C4 + \Delta) - \sim N(0,1)(C3 + \Delta) = 2.2\%$$

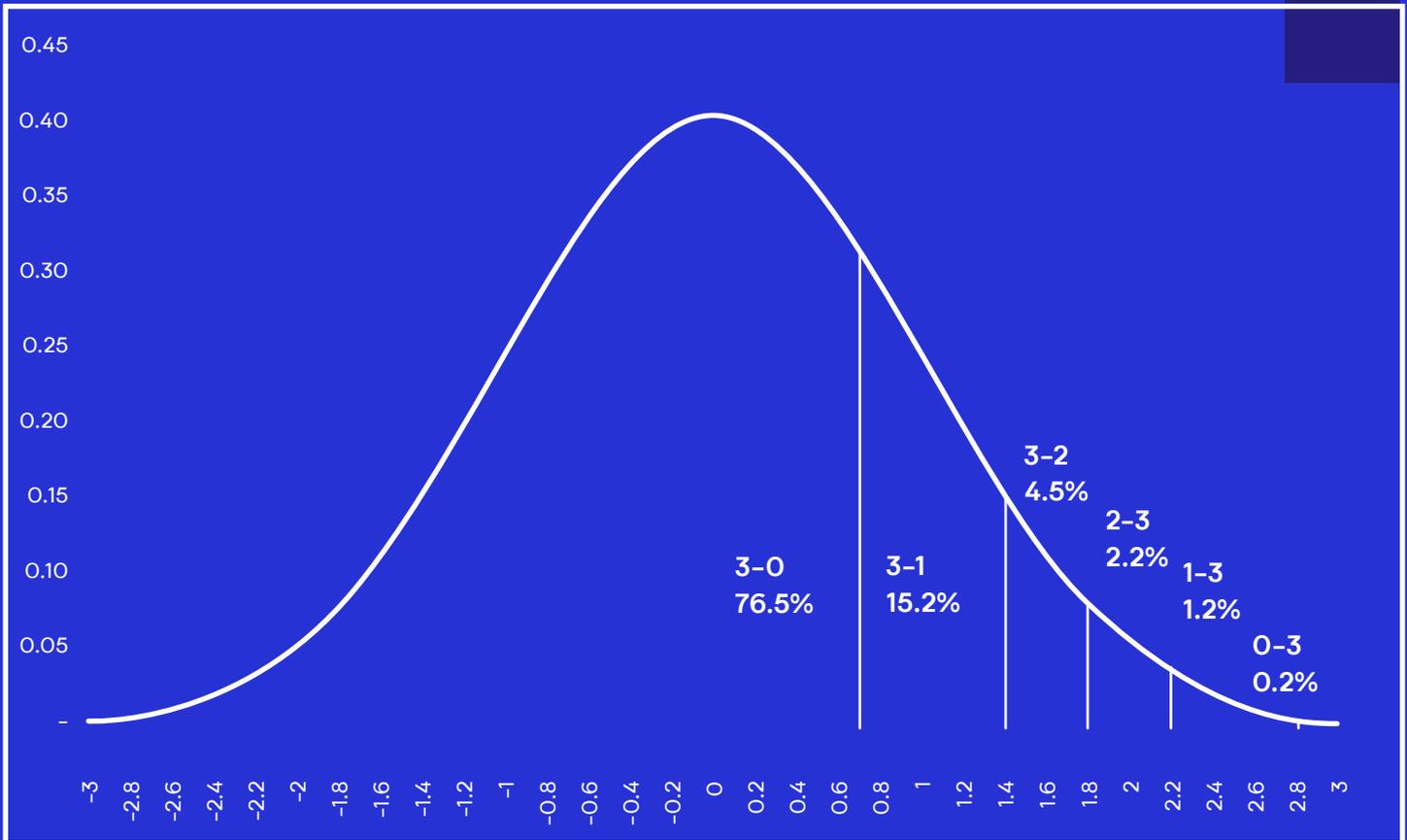
$$P5 = \text{Probability of } \mathbf{1 - 3} \text{ result} = \sim N(0,1)(C5 + \Delta) - \sim N(0,1)(C4 + \Delta) = 1.2\%$$

$$P6 = \text{Probability of } \mathbf{0 - 3} \text{ result} = 1 - \sim N(0,1)(C5 + \Delta) = 0.2\%$$

Match Result	Set Score Variant	Probability
3-0	+2	76.5%
3-1	+1.5	15.2%
3-2	+1	4.5%
2-3	-1	2.2%
1-3	-1.5	1.2%
0-3	-2	0.2%

$EMR = 76.5\% * (+2) + 15.2\% * (+1.5) + 4.5\% * +1 + 2.2\% * (-1) + 1.2\% * (-1.5) + 0.2\% * (-2) = +1.76$   
 The expected match result is +1.76, which corresponds to a higher win probability for Brazil than for Japan.

### MATCH ODDS BRASIL - JAPAN



**SCENARIO 1  
BRAZIL 3-0 JAPAN**



The difference between the actual result (set score variant) and the expected match result gives the WR value.  
 $WR\ value = SSV - EMR = +2 - (+1.76) = +0.24$   
 The WR value is then multiplied by the Match Weight Factor of the event and divided by the standard scaling factor to get the WR points.  
 $WR\ points = WR\ value * MWF / 8 = +0.24 * 50 / 8 = +1.5$

Brazil new WR score:  $415 + 1.5 = 416.5$   
 Japan new WR score:  $192 - 1.5 = 190.5$

The WR scores reflect the strength of each team, consequently there is now higher expectations on Brazil to perform in the next match.

**SCENARIO 2  
BRAZIL 3-1 JAPAN**



The difference between the actual result (set score variant) and the expected match result gives the WR value.  
 $WR\ value = SSV - EMR = +1.5 - (+1.76) = -0.26$   
 The WR value is then multiplied by the Match Weight Factor of the event and divided by the standard scaling factor to get the WR points.  
 $WR\ points = WR\ value * MWF / 8 = -0.26 * 50 / 8 = -1.625$

A key principle of the World Ranking is that a team winning a match cannot lose WR points. Because Brazil delivered a lower performance than expected, the team is rewarded with the minimum WR points.  
 Brazil new WR score:  $415 + 0.01 = 415.1$   
 Japan new WR score:  $192 - 0.01 = 191.9$

**SCENARIO 3  
BRAZIL 3-2 JAPAN**



The difference between the actual result (set score variant) and the expected match result gives the WR value.  
 $WR\ value = SSV - EMR = +1 - (+1.76) = -0.76$   
 The WR value is then multiplied by the Match Weight Factor of the event and divided by the standard scaling factor to get the WR points.  
 $WR\ points = WR\ value * MWF / 8 = -0.76 * 50 / 8 = -4.75$

A key principle of the World Ranking is that a team winning a match cannot lose WR points. Because Brazil delivered a lower performance than expected, the team is rewarded with the minimum WR points.  
 Brazil new WR score:  $415 + 0.01 = 415.1$   
 Japan new WR score:  $192 - 0.01 = 191.9$

**SCENARIO 4  
BRAZIL 2-3 JAPAN**



The difference between the actual result (set score variant) and the expected match result gives the WR value.  
 $WR\ value = SSV - EMR = -1 - (+1.76) = -2.76$   
 The WR value is then multiplied by the Match Weight Factor of the event and divided by the standard scaling factor to get the WR points.  
 $WR\ points = WR\ value * MWF / 8 = -2.76 * 50 / 8 = -17.25$

Brazil new WR score:  $415 - 17.25 = 397.75$   
 Japan new WR score:  $192 + 17.25 = 209.25$

The WR scores reflect the strength of each team, consequently there is now higher expectations on Japan to perform in the next match.

**SCENARIO 5  
BRAZIL 1-3 JAPAN**



The difference between the actual result (set score variant) and the expected match result gives the WR value.  
 $WR\ value = SSV - EMR = -1.5 - (+1.76) = -3.26$   
 The WR value is then multiplied by the Match Weight Factor of the event and divided by the standard scaling factor to get the WR points.  
 $WR\ points = WR\ value * MWF / 8 = -3.26 * 50 / 8 = -20.375$

Brazil new WR score:  $415 - 20.375 = 394.625$   
 Japan new WR score:  $192 + 20.375 = 212.375$

The WR scores reflect the strength of each team, consequently there is now higher expectations on Japan to perform in the next match.

**SCENARIO 6  
BRAZIL 0-3 JAPAN**



The difference between the actual result (set score variant) and the expected match result gives the WR value.  
 $WR\ value = SSV - EMR = -2 - (+1.76) = -3.76$   
 The WR value is then multiplied by the Match Weight Factor of the event and divided by the standard scaling factor to get the WR points.  
 $WR\ points = WR\ value * MWF / 8 = -3.76 * 50 / 8 = -23.5$

Brazil new WR score:  $415 - 23.5 = 391.5$   
 Japan new WR score:  $192 + 23.5 = 215.5$

The WR scores reflect the strength of each team, consequently there is now higher expectations on Japan to perform in the next match.

Match Result	Probability	Brazil WR points	Japan WR points
3-0	76.5%	+1.5	-1.5
3-1	15.2%	+0.01	-0.01
3-2	4.5%	+0.01	-0.01
2-3	2.2%	-17.25	+17.25
1-3	1.2%	-20.375	+20.375
0-3	0.2%	-23.5	+23.5