**Probability:**

Standard Rules:

'p\*p\*p’ (3, 0) +

'p\*p\*(1-p)\*q\*(1-q)’ (3, 2) +

'p\*p\*(1-p)\*(1-q)’ (3, 1) +

'p\*(1-p)\*q\*(1-q)\*p' (3, 2) +

'p\*(1-p)\*(1-q)\*p' (3, 1) +

'p\*(1-p)\*(1-q)\*(1-p)\*(1-q)' (3, 2) +

'(1-p)\*q\*(1-q)\*p\*p' (3, 2) +

'(1-p)\*(1-q)\*p\*p' (3, 1) +

'(1-p)\*(1-q)\*p\*(1-p)\*(1-q)' (3,2) +

'(1-p)\*(1-q)\*(1-p)\*(1-q)\*p' (3, 2) +

Put into equation, sum up all of the probabilities:

SrPr(A) = p\*p\*p + p\*p\*(1-p)\*q\*(1-q) + p\*p\*(1-p)\*(1-q) + p\*(1-p)\*q\*(1-q)\*p + p\*(1-p)\*(1-q)\*p + p\*(1-p)\*(1-q)\*(1-p)\*(1-q) + (1-p)\*q\*(1-q)\*p\*p + (1-p)\*(1-q)\*p\*p + (1-p)\*(1-q)\*p\*(1-p)\*(1-q) + (1-p)\*(1-q)\*(1-p)\*(1-q)\*p

Expand and simplify the equation:

SrPr(A) = p\*(p\*\*2 + 3\*p\*q\*(p - 1)\*(q - 1) + 3\*p\*(p - 1)\*(q - 1) + 3\*(p - 1)\*\*2\*(q - 1)\*\*2)

Catch-Up Rules:

'p\*q\*p\*q\*p' (3, 2) +

'p\*q\*p\*(1-q)’ (3, 1) +

'p\*q\*(1-p)\*p\*(1-q)' (3, 2) +

'p\*(1-q)\*q\*p' (3, 1) +

'p\*(1-q)\*q\*(1-p)\*p' (3, 2) +

'p\*(1-q)\*(1-q)' (3, 0) +

'(1-p)\*p\*q\*p\*(1-q)' (3, 2) +

'(1-p)\*p\*(1-q)\*q\*p' (3, 2) +

'(1-p)\*p\*(1-q)\*(1-q)' (3, 1) +

'(1-p)\*(1-p)\*p\*(1-q)\*(1-q)' (3, 2) +

Put into equation, sum up all of the probabilities:

CrPr(A) = p\*q\*p\*q\*p + p\*q\*p\*(1-q) + p\*q\*(1-p)\*p\*(1-q) + p\*(1-q)\*q\*p + p\*(1-q)\*q\*(1-p)\*p + p\*(1-q)\*(1-q) + (1-p)\*p\*q\*p\*(1-q) + (1-p)\*p\*(1-q)\*q\*p + (1-p)\*p\*(1-q)\*(1-q) + (1-p)\*(1-p)\*p\*(1-q)\*(1-q)

Expand and simplify the equation:

CrPr(A) = p\*(6\*p\*\*2\*q\*\*2 - 6\*p\*\*2\*q + p\*\*2 - 9\*p\*q\*\*2 + 12\*p\*q - 3\*p + 3\*q\*\*2 - 6\*q + 3)

Standard Rules Can’t Win More Than 2:

'p\*p\*q\*q\*p' (3, 2) +

'p\*p\*q\*(1-q)' (3, 1) +

'p\*p\*(1-q)' (3, 0) +

'p\*(1-p)\*q\*p\*p' (3, 2) +

'p\*(1-p)\*(1-q)\*p' (3, 1) +

'p\*(1-p)\*(1-q)\*(1-p)\*(1-q)' (3, 2) +

'(1-p)\*q\*p\*p\*(1-q)' (3, 2) +

'(1-p)\*(1-q)\*p\*q\*(1-q)' (3, 2) +

'(1-p)\*(1-q)\*p\*(1-q)' (3, 1) +

'(1-p)\*(1-q)\*(1-p)\*(1-q)\*p' (3, 2) +

Put into equation, sum up all of the probabilities:

SrCWMTPr(A) = p\*p\*q\*q\*p + p\*p\*q\*(1-q) + p\*p\*(1-q) + p\*(1-p)\*q\*p\*p + p\*(1-p)\*(1-q)\*p + p\*(1-p)\*(1-q)\*(1-p)\*(1-q) + (1-p)\*q\*p\*p\*(1-q) + (1-p)\*(1-q)\*p\*q\*(1-q) + (1-p)\*(1-q)\*p\*(1-q) + (1-p)\*(1-q)\*(1-p)\*(1-q)\*p

Expand and simplify the equation:

SrCWMTPr(A) = p\*(-p\*\*3\*q + 4\*p\*\*2\*q\*\*2 - 3\*p\*\*2\*q + p\*\*2 - p\*q\*\*3 - 5\*p\*q\*\*2 + 9\*p\*q - 3\*p + q\*\*3 + q\*\*2 - 5\*q + 3)

Trailing Rules (A):

'p\*q\*p\*q\*p' (3, 2) 2 Ties (3) @

'p\*q\*p\*(1-q)’ (3, 1) 1 Tie (2) @

'p\*q\*(1-p)\*p\*(1-q)' (3, 2) 2 Ties (2) @

'p\*(1-q)\*q\*q\*p' (3, 2) 1 Tie (2) @

'p\*(1-q)\*q\*(1-q)' (3, 1) 0 Ties (1) @

'p\*(1-q)\*(1-q)' (3, 0) 0 Ties (1) @

'(1-p)\*p\*q\*p\*(1-q)' (3, 2) 2 Ties (2) @

'(1-p)\*p\*(1-q)\*q\*p' (3, 2) 2 Ties (2) @

'(1-p)\*p\*(1-q)\*(1-q)' (3, 1) 1 Tie (1) @

'(1-p)\*(1-p)\*p\*p\*(1-q)' (3, 2) 1 Tie (2)

Put into equation, sum up all of the probabilities:

TrPr(A) = p\*q\*p\*q\*p + p\*q\*p\*(1-q) + p\*q\*(1-p)\*p\*(1-q) + p\*(1-q)\*q\*q\*p + p\*(1-q)\*q\*(1-q) + p\*(1-q)\*(1-q) + (1-p)\*p\*q\*p\*(1-q) + (1-p)\*p\*(1-q)\*q\*p + (1-p)\*p\*(1-q)\*(1-q) + (1-p)\*(1-p)\*p\*p\*(1-q)

Expand and simplify the equation:

TrPr(A) = p\*(-p\*\*3\*q + p\*\*3 + 4\*p\*\*2\*q\*\*2 - p\*\*2\*q - 2\*p\*\*2 - p\*q\*\*3 - 4\*p\*q\*\*2 + 5\*p\*q + q\*\*3 - 3\*q + 2)