Ronin's Honor RTP Formulae

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In this document, I will outline the formulas used to determine the RTP of Ronin's Honor, breaking down each component .

Game Symbols and Mechanics

First to understand the formulae we need to understand the symbols of the game and it's meta mechanics

Weapon Symbols

Weapon Red: x5 =15, x4=3, x3=1.5

Weapon Purple:x5 =12, x4=2.4, x3=1.20

Weapon Blue:x5 =6, x4=1.2, x3=0.9

Weapon Green: x5 =4.50, x4=0.90, x3=0.60

Royal Symbols

Red: x5 =1.2, x4=0.6, x3=0.3

Purple:x5 =1.2, x4=0.6, x3=0.3

Blue:x5 =0.9, x4=0.6, x3=0.3

Green: x5 =0.9, x4=0.6, x3=0.3

The weapon and royal symbols come under **Regular Symbols.**

Special Symbols

- **There are two wild symbols in this game, Ninja wilds and Hannya wilds.** Both wilds substitute for all symbols except the scatter symbol or the mask.

- **Mystery Mask: These consider split mechanics.** Where each symbol can be split upto 3.
- **Free Spins**

RTP Formuale

Total RTP The total RTP of the game is the sum of the Base Game RTP and the Free Spins RTP:

Total RTP= (Base Game RTP + Free Spin RTP)// Total Bet Amount

Base Game RTP

The ‘Base Game RTP’ consists of the ‘Regular Symbols RTP’ (Including the impact of wild symbols and Mystery Masks) and **Scatter RTP.**

Base Game RTP = **Regular Symbols RTP** (including wild symbols and Mystery Mask impact) + S**catter RTP**

Regular Symbols RTP (including wild symbols and Mystery Mask impact)

To calculate the Regular Symbols RTP, we need to consider the impact of wild symbols and Mystery Masks on the probability of forming winning combinations.

Regular Symbols RTP = Sum of [P(adjusted) * Payout] for all winning combinations

Where P(adjusted) is the adjusted probability of forming a winning combination, considering the impact of wild symbols and Mystery Masks:

P(adjusted) = [P(original) + P(W_1)] * [P(original) + P(W_2)] * [P(original) + P(W_3)] * [P(original) + P(W_4)] * [P(original) + P(W_5)] * (1 + P(MM_1) * P(PS|MM_1) * (1 + P(1S|PS_1) + P(2S|PS_1))) * (1 + P(MM_2) * P(PS|MM_2) * (1 + P(1S|PS_2) + P(2S|PS_2))) * ... * (1 + P(MM_5) * P(PS|MM_5) * (1 + P(1S|PS_5) + P(2S|PS_5)))

- P(original) is the probability of forming a winning combination without wild symbols or Mystery Masks
- P(W_R) is the probability of a wild symbol appearing on reel R (R = 1, 2, 3, 4, 5)
- P(MM_R) is the probability of a Mystery Mask appearing on reel R
- P(PS|MM_R) is the probability of a Pay Symbol appearing given a Mystery Mask on reel R
- P(1S|PS_R) is the probability of a Pay Symbol splitting once on reel R
- P(2S|PS_R) is the probability of a Pay Symbol splitting twice on reel R

Scatter RTP

Scatter RTP = Sum of [P(scatter combination) * Payout] for all winning scatter combinations

Free Spin RTP

Formulae:

Free Spins RTP = P(FS) * [(P(RW) * RTP(RW)) + (P(HB) * RTP(HB)) + (P(HFS) * RTP(HFS)) + (P(DH) * RTP(DH)) + Regular Symbols RTP (including wild symbols and Mystery Mask impact)]

P(FS) is the probability of triggering the free spins feature (Probability of 3 scatter +4 scatter +5 scatter)

P(RW) is the probability of Ronin winning a life (splitting a wild and killing ninja , this will be a direct number)

RTP(RW) is the RTP contribution of a Ronin win (splitting a wild)

1. RTP(RW) = P(RW) * E(RW) Where:
    a. P(RW) is the probability of Ronin successfully splitting a wild symbol during the free spins.
    b. E(RW) is the expected value (average payout) of a Ronin win when a wild symbol is split. This can be calculated by considering the probability of each

winning combination that includes the split wild symbol and their respective payouts.

P(HB) is the probability of Hannya blocking

RTP(HB) is the RTP contribution of a Hannya block

- RTP(HB) = RTP(FS_RW) - RTP(FS_HB) Where:
    - RTP(FS_RW) is the RTP of the free spins when Ronin successfully splits a wild.
    - RTP(FS_HB) is the RTP of the free spins after a Hannya block (reduced RTP due to fewer chances of splitting wilds). RTP(HB) represents the reduction in RTP caused by a Hannya block, compared to a successful wild split by Ronin.

P(HFS) is the probability of triggering a Hannya free spin

RTP(HFS) is the RTP contribution of a Hannya free spin

- RTP(HFS) = P(HFS) * E(HFS) Where:
    - P(HFS) is the probability of triggering a Hannya free spin during the free spins feature.
    - E(HFS) is the expected value (average payout) of a Hannya free spin. This can be calculated by considering the probability of each winning combination that can occur during a Hannya free spin and their respective payouts.

P(DH) is the probability of defeating Hannya

RTP(DH) is the RTP contribution of defeating Hannya

- RTP(DH) = P(DH) * E(DH) Where:
    - P(DH) is the probability of defeating Hannya during the free spins feature.
    - E(DH) is the expected value (average payout) of defeating Hannya. In your previous example, you mentioned that defeating Hannya awards a 30,000x prize. So, E(DH) would be equal to 30,000 times the bet amount.

Further Explanation

To make the formulae breakdown easier I had to Refactorize each section of the formuale.

Thus to find the probability of each symbol

- We had to have count of each symbol on each reel.
- Thus the probability of symbol X would be= no. Of symbol x in reel 1/ total no of symbols in reel 1

To find the RTP contribution