

# Jayhawk Riches

Kansas K.A.R. 111-23-9 (v43 synth) · eInstant Cert Pack v1

Issued: 2026-05-15T21:45:41.395490Z · Authority: Multi.Bingo iLottery RGS  
Signing key: Ed25519 · ID d651f1b9f793f40d

## Math validation

<b>Pool size</b>	10,000,000
<b>RTP @ unit denom</b>	88.0000%
<b>Top prize (max denom)</b>	\$36,000,000
<b>Bonus engine</b>	generic_bonus

## 1. Game specification (Kansas K.A.R. 111-23-9 (v43 synth))

**Jayhawk Riches** is an instant lottery game governed by Kansas K.A.R. 111-23-9 (v43 synth). Finite-pool model with 10,000,000 shares per pool. The bit-exact payable below has been imported from the K.A.R. (j) odds table.

**Prize formula:**  $\text{prize\_cents} = \text{multiplier} \times \text{denom\_cents} \times \text{tickets\_purchased}$

## 2. Paytable (13 tiers)

Multiplier	Count in pool	Odds (1 in)
x360000	1	10,000,000.00
x36000	11	909,090.91
x7200	58	172,413.79
x1800	234	42,735.04
x250	1,688	5,924.17
x100	6,752	1,481.04
x50	13,504	740.52
x25	33,760	296.21
x10	101,280	98.74
x5	202,560	49.37
x2	506,400	19.75
x1	844,000	11.85
x0.5	1,412,800	7.08

### 3. Pool architecture

Each pool consists of 10,000,000 shares. Pool generation: RGS service `multibingo-rng:9443` provides the server seed (RNG\_STRICT=true, no local fallback). Paytable counts written into array, shuffled with `mulberry32(SHA-256(server_seed))` Fisher-Yates. Pool audit\_hash chained via Ed25519 signature. Tickets consumed sequentially; outcome = multiplier at position in shuffled array.

### 4. Audit chain (K.A.R. h)

Daily Merkle root signed with Ed25519 (key ID `d651f1b9f793f40d`). Leaves = ticket\_hash + pool\_hash. Persisted in WORM-locked PG row + audit blob to disk (S3 Object Lock in prod). Each day's row stores `prev_root_sha256` forming a hash chain.

### 5. Verifier endpoints

```
GET /api/ilottery/games/JAYHAWK_RICHES/paytable
GET /api/ilottery/games/JAYHAWK_RICHES/config?jur=GLI-SANDBOX
POST /api/ilottery/games/JAYHAWK_RICHES/open-pool
POST /api/ilottery/games/JAYHAWK_RICHES/play
POST /api/ilottery/vector/replay (game_code=JAYHAWK_RICHES)
GET /api/ilottery/verify/:ticket_id
GET /api/ilottery/merkle/proof/:ticket_id
GET /api/ilottery/audit/public-key
```

### 6. Test vectors v1

URL: [https://kobowlotto.com/mathforge/ilottery/gdd/jayhawk\\_riches/vectors\\_v1.json](https://kobowlotto.com/mathforge/ilottery/gdd/jayhawk_riches/vectors_v1.json)  
600 vectors × 5 denoms = 3,000 prize data points (6 tiers × 100 each).

### 7. Operator Ed25519 public key

```
-----BEGIN PUBLIC KEY-----
MCowBQYDK2VwAyEAU2k0zXnm09QHDuKlSEQYUAFeACAeOTUceEuiRGLSiXs=
-----END PUBLIC KEY-----
```