

Silver Fox Hunt

Kansas K.A.R. 111-23-1 (v43 synth) · eInstant Cert Pack v1

Issued: 2026-05-15T21:45:31.022069Z · Authority: Multi.Bingo iLottery RGS
Signing key: Ed25519 · ID d651f1b9f793f40d

Math validation

Pool size	10,000,000
RTP @ unit denom	88.0000%
Top prize (max denom)	\$450,000
Bonus engine	generic_bonus

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

Silver Fox Hunt is an instant lottery game governed by Kansas K.A.R. 111-23-1 (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)
x15000.0	29	344,827.59
x1500.0	278	35,971.22
x300.0	1,394	7,173.60
x250	1,673	5,977.29
x100	6,692	1,494.32
x75.0	5,576	1,793.40
x50	13,384	747.16
x25	33,460	298.86
x10	100,380	99.62
x5	200,760	49.81
x2	501,900	19.92
x1	836,500	11.95
x0.5	1,341,100	7.46

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/SILVER_FOX_HUNT/paytable
GET /api/ilottery/games/SILVER_FOX_HUNT/config?jur=GLI-SANDBOX
POST /api/ilottery/games/SILVER_FOX_HUNT/open-pool
POST /api/ilottery/games/SILVER_FOX_HUNT/play
POST /api/ilottery/vector/replay (game_code=SILVER_FOX_HUNT)
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/silver_fox_hunt/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-----
```