

Lab 10 — Trading Rules

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Data

- Asset: BTC-USD or SOL-USD
 - Timeframe: daily candles (close price + volume)
 - Lookback window: 20 bars for all rolling calculations
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Entry Condition

Step 1 — Compute the 20-day rolling mean and standard deviation of close price.

Step 2 — Compute z-score:

```
z_score = (close - rolling_mean) / rolling_std
```

Step 3 — Enter when:

```
z_score > 2.0
```

Step 4 — If already in a trade, skip the signal. One trade at a time.

Exit Conditions (checked in this order every bar)

Priority	Condition	Meaning
1st	<code>return >= TP%</code>	Take profit — target hit (BTC: 10%, SOL: 13%)
2nd	<code>z_score < -2.0</code>	Stop loss — price genuinely reversed
3rd	<code>bars_held >= 60</code>	Time cap — cut exposure regardless

Exit on whichever fires first.

Position Sizing

- Flat binary: **100% of capital in** when a signal fires, **0% out** otherwise
 - Compound across trades (reinvest full capital each time)
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What We Don't Know Yet

- **Optimal exit timing** — the 10% take-profit and 60-bar cap are reasonable but not optimised. A dedicated momentum-exhaustion study is needed (future lab).
 - **SOL z-score regime** — the same 20-day window is used for both assets; SOL may benefit from a shorter window given its higher volatility.
 - **Transaction costs** — slippage and fees are not modelled. Real-world returns will be lower.
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Backtest Summary (2017–2026 BTC, 2021–2026 SOL)

	BTC	SOL
Starting capital	\$10,000	\$10,000
Ending capital	\$215,828	\$320,000
Total return	+2,058%	+3,100%
Trades	76	56
Win rate	67%	82%
Avg trade return	+4.9%	+7.5%
Take-profit	10%	13% (Lab 10-C)

Possible Tweaks

1. **Rolling window** — try 14 or 30 days instead of 20; shorter = more signals, longer = higher quality
2. **Entry threshold** — try $z > 1.5$ (more trades) or $z > 2.5$ (fewer, higher conviction)
3. **Take-profit level** — 10% is the current sweet spot; test 8% or 12% on SOL given its higher volatility
4. **z_exit threshold** — currently -2.0; tightening to -1.5 would cut losses faster but risk more false stops