

Reg Z Sample H-14: an ARM walkthrough



MortgageMath
Precise Loan Amortization in Python

mortgagemath 0.5.0 · rendered 2026-04-30

ARM mechanics

An adjustable-rate mortgage (ARM) starts at an initial rate, then adjusts at scheduled intervals — the **reset cadence**. At each reset:

1. The new **fully indexed rate** is computed: index + margin.
2. The **periodic cap** bounds year-over-year movement (typically 2 percentage points in either direction).
3. The **lifetime cap** bounds the rate's distance from the initial rate (typically 5 pp above and/or below).
4. After clamping, the loan **recasts**: the level payment is recomputed over the remaining term using the post-cap rate applied to the current balance.

12 CFR Part 1026 Appendix H Sample H-14 is the regulatory worked example. The library reproduces every published anchor to the cent under `BalanceTracking.ROUND_EACH + ROUND_HALF_UP`.

The example

Loan terms (per \$10,000 normalized):

Term	Value
Principal	\$10,000
Term	30 years (360 monthly payments)
Index	1-year CMT (Constant Maturity Treasury)
Margin	3.00 percentage points
Initial rate	17.41% (= 14.41% CMT + 3.00 pp, July 1982)
Periodic cap	2 pp annual
Lifetime cap	5 pp symmetric (rate stays within initial ± 5 pp)
Reset	Annual (every 12 payments)

Cap derivation, year by year

Yr	Year	CMT index	Fully indexed	Cap binds?	Effective rate
1	1982	14.41%	17.41%	(initial)	17.41%
2	1983	9.78%	12.78%	periodic (down)	15.41%
3	1984	12.17%	15.17%	—	15.17%
4	1985	7.66%	10.66%	periodic (down)	13.17%
5	1986	6.36%	9.36%	lifetime (floor)	12.41%
6+	1987–1996	varies	≤ 9.36%	lifetime holds	12.41%

The lifetime floor is $\text{initial} - 5 \text{ pp} = 17.41 - 5 = 12.41\%$. From 1986 onward (year 5 of this 1982 loan), the fully indexed rate would be below the floor, so the floor binds and the rate stays at **12.41%** through 1996 — though the payment still recasts annually on the new remaining balance.

Encoded as LoanParams

```
from decimal import Decimal
from mortgagemath import (
    LoanParams, RateChange, PaymentRounding, BalanceTracking,
    amortization_schedule,
)

# Years 2–15: post-cap rates one per year.
rates = (
    "15.41", "15.17", "13.17", "12.41",
    *(["12.41"] * 10),
)

loan = LoanParams(
    principal=Decimal("10000"),
    annual_rate=Decimal("17.41"),
    term_months=360,
    payment_rounding=PaymentRounding.ROUND_HALF_UP,
    interest_rounding=PaymentRounding.ROUND_HALF_UP,
    balance_tracking=BalanceTracking.ROUND_EACH,
    rate_schedule=tuple(
        RateChange(
            effective_payment_number=12 * (yr - 1) + 1,
            new_annual_rate=Decimal(rate),
        )
        for yr, rate in enumerate(rates, start=2)
    ),
)
sched = amortization_schedule(loan)
```

Live anchor verification

Anchor	Library	Reg Z published	Match
first row, year 1 (pmt 1)	\$145.90	\$145.90	✓
balance after year 1 (pmt 12)	\$9,989.37	\$9989.37	✓
first row, year 2 (pmt 13)	\$129.81	\$129.81	✓
balance after year 2 (pmt 24)	\$9,969.66	\$9969.66	✓
first row, year 3 (pmt 25)	\$127.91	\$127.91	✓
balance after year 3 (pmt 36)	\$9,945.51	\$9945.51	✓
first row, year 4 (pmt 37)	\$112.43	\$112.43	✓
balance after year 4 (pmt 48)	\$9,903.70	\$9903.70	✓
first row, year 5 (pmt 49)	\$106.73	\$106.73	✓
balance after year 5 (pmt 60)	\$9,848.94	\$9848.94	✓
balance after year 15 (pmt 180)	\$8,700.37	\$8700.37	✓

The shape of payment recasts

Year	Effective rate	First-of-year P&I
1	17.41%	\$145.90
2	15.41%	\$129.81
3	15.17%	\$127.91
4	13.17%	\$112.43
5	12.41%	\$106.73
6	12.41%	\$106.73
7	12.41%	\$106.73
8	12.41%	\$106.73
9	12.41%	\$106.73
10	12.41%	\$106.73
11	12.41%	\$106.72
12	12.41%	\$106.73
13	12.41%	\$106.72
14	12.41%	\$106.72
15	12.41%	\$106.73

The annual P&I drops from \$145.90 (year 1) to \$106.73 (year 5) as the falling CMT trajectory pushes the rate against the 5 pp lifetime floor. Beyond year 5 the rate is constant at 12.41%, but the payment still subtly drifts at single-cent magnitudes year-over-year because the recast formula re-anneals the remaining balance to a fresh amortization horizon.

Source

12 CFR Part 1026, Appendix H, Sample H-14 — public-domain Federal regulation. Fixture: `tests/schedules/regz_apph_h14_arm_10k_1741_360mo.{toml,csv}`.