Unit 5 · Auto Loans & Borrowing Cheat Sheet

Unit 5 focus: compare payments, APR, term and total borrowing cost

1 LOAN VOCABULARY

Term	Meaning / quick example
Principal	Amount borrowed and still unpaid.
Interest rate	Rate used to calculate interest charges.
APR	Annualized borrowing cost including certain fees.
Term	Time allowed to repay; months here.

2 INSTALLMENT PAYMENT

$$D = \frac{Pi}{1-(1+i)^{-N}}$$

P = amount borrowed in dollars; i = monthly interest rate; N = monthly payments; D = dollars per month.

$i = \frac{r}{12}$ with annual decimal interest rate r.

Fixed rate; payments at month end; no fees. At 0% interest: $D = \frac{P}{N}$.

APR equals r only in the simplified no-fee model.

3 PAYMENT & FINANCE COST

Assume $22,000 financed, 6.9% annual interest, no fees, 48 monthly payments.

Example: $i = \frac{0.069}{12}$; formula gives D ≈ $525.80.

Total payments: $48D \approx 25{,}238.27$

Interest: $48D - 22{,}000 \approx 3{,}238.27$

Answer: About $3,238.27 interest

4 ONE AMORTIZATION ROW

Each month:

$I = Bi$

$Q = D - I$

$B_{\text{new}} = B - Q$

B = opening balance dollars; I = interest dollars; Q = principal dollars; D = payment.

Use the rate for **one payment period**. Interest generally shrinks as the balance falls; more of a fixed payment then reduces principal.

Keep full precision in projections; round money at the final step.

5 FIRST PAYMENT EXAMPLE

Item	Amount
Opening balance	$22,000.00
Interest at 0.575% monthly	$126.50
Payment (rounded)	$525.80
Principal repaid	$399.30
New balance	$21,600.70

This row uses cent-rounded payment and interest. Later rows and the final payment can differ slightly from a full-precision projection.

6 FIND AMOUNT FINANCED

- Start with out-the-door price: vehicle, tax, title and fees.
- Subtract down payment and net trade-in equity.
- If trade-in debt exceeds value, negative equity may be added to the new loan.
- Compare financing with and without add-ons.
- A $25,000 total price − $3,000 cash down gives $22,000 financed, assuming no trade-in or other financed costs.

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More practice: trace amortization and judge affordability

1 WHICH TERM IS BETTER?

$22,000 at 6.9%	48 months	84 months
Monthly payment	$525.80	$330.96
Total repaid ≈	$25,238.27	$27,801.02
Interest ≈	$3,238.27	$5,801.02

Fixed rate, no fees; totals use unrounded payments. The 48-month loan saves about $2,562.75 interest. The 84-month option eases monthly cash flow but keeps debt longer.

2 MAXIMUM LOAN FOR A BUDGET

$$P = \frac{D[1-(1+i)^{-N}]}{i}$$

D = affordable monthly loan payment; i = monthly decimal rate; N = months.

At 6% interest over 60 months with D = $300:

$$P = \frac{300[1-(1.005)^{-60}]}{0.005}$$

About $15,517.67 financed

Reserve cash for insurance, fuel, repairs and registration too.

3 LEASE VOCABULARY

Term	Meaning / quick example
Capitalized cost	Negotiated lease price, adjusted by contract items.
Residual	Contract's estimated end-of-lease value.
Money factor	Factor used for lease finance charge.
Mileage limit	Going over it may create an extra charge.

4 SIMPLIFIED LEASE PAYMENT

Before taxes and fees: depreciation + finance charge. Contract terms determine actual costs.

Example: Cap cost $30,000; residual $18,000; 36 months; money factor 0.002.

Depreciation: $\frac{30{,}000-18{,}000}{36} \approx 333.33$

Finance: $(30{,}000+18{,}000)(0.002)=96$

Answer: About $429.33 per month

5 COMPARE COMPLETE OFFERS

- Same vehicle price and cash down?
- Same fees, APR and payment timing?
- Total of payments and any final balloon payment?
- For a lease: upfront charges, mileage, wear and buyout terms?
- How much will the car cost to operate?
- A lower payment may fit today; ask whether the longer term creates negative-equity risk.

6 REMINDERS & MISTAKES

✓ Do remember

- Choose an affordable total cost, not only a payment.
- Money factor × 2,400 approximates lease APR in percent.

✗ Common mistakes

- APR always equals interest rate: fees may make APR higher.
- Approval means affordable: test your own budget.
- Interest stays constant: it follows the outstanding balance.
- Lease payments build equity: ownership requires a separate purchase.