

# What is a Mortgage?

## Worksheet

A mortgage is a home loan secured by the property. Monthly payment  $M = \frac{P[r(1+r)^n]}{(1+r)^n - 1}$ , where  $P$  is principal,  $r$  is monthly rate, and  $n$  is total months.

$$M = \frac{P[r(1+r)^n]}{(1+r)^n - 1}$$

$M$  = Monthly Payment (\$)

$P$  = Principal (loan amount) (\$)

$r$  = Monthly interest rate (decimal (annual  $\div$  12))

$n$  = Total payments (months) (months)

## Questions

1. In a 30-year mortgage, where does most of the first payment go?

- A) Principal
- B) Interest
- C) Property tax
- D) Homeowner's insurance

2. What role does the property play in a mortgage?

- A) Determines the interest rate
- B) Serves as collateral
- C) Requires appraisal
- D) All of the above

3. A fixed-rate mortgage means...

- A) The rate never changes
- B) The payment never changes
- C) Only the principal changes
- D) Interest compounds annually

4. Why might someone choose a 15-year mortgage over 30 years?

- A) Lower interest rate
- B) Pay less total interest
- C) Build equity faster
- D) All of the above

5. A \$400,000 home with 20% down, 6% annual rate, 30-year mortgage. Monthly payment?

6. \$250,000 mortgage at 4% for 15 years. Find monthly payment.

7. \$500,000 home, 10% down, 5% rate, 30 years. Total interest paid?

8. Define: What is a mortgage?

9. Define: 30-year vs. 15-year mortgage?

10. Define: What is a fixed-rate mortgage?

## Answer Key

1. B) Interest — Early payments are mostly interest; principal paydown accelerates over time.
2. D) All of the above — The property is collateral, must be appraised, and affects the rate offered.
3. A) The rate never changes — The rate stays constant; however, in some mortgages, escrow payments for taxes/insurance may vary.
4. D) All of the above — 15-year mortgages have higher monthly payments but lower total interest and faster home ownership.
5. Down payment:  $400,000 \times 0.2 = 80,000$  Principal  $P = 400,000 - 80,000 = 320,000$  Monthly rate  $r = 6\% \div 12 = 0.005$  Months  $n = 30 \times 12 = 360$   $M = 320,000 \times [0.005(1.005)^{360}] / [(1.005)^{360} - 1] \approx 1,919$
6.  $r = 4\% \div 12 \approx 0.00333$   $n = 15 \times 12 = 180$   $M = 250,000 \times [0.00333(1.00333)^{180}] / [(1.00333)^{180} - 1] \approx \$1,849$
7. Principal  $P = 500,000 \times 0.9 = 450,000$  Monthly payment  $M \approx 2,415$  Total paid:  $2,415 \times 360 = 869,400$  Total interest:  $869,400 - 450,000 = 419,400$
8. A long-term loan to buy real estate; the property serves as collateral for the loan.
9. 30-year has lower monthly payment but more total interest; 15-year builds equity faster with less interest.
10. Interest rate stays the same for the entire loan term.

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