

### 1. Simple Interest Formulas

- $I = Prt$
- $A = P + Prt$

### 2. Compound Interest Formula

- $A = P \left(1 + \frac{r}{n}\right)^{nt}$

### 3. Effective Rate

- $E = \left(1 + \frac{r}{n}\right)^n - 1$

### 4. Annuity Formulas (Future value of payments)

- $A = \frac{R \cdot \left[\left(1 + \frac{r}{n}\right)^{nt} - 1\right]}{\left(\frac{r}{n}\right)}$
- $R = \frac{A \cdot \left(\frac{r}{n}\right)}{\left[\left(1 + \frac{r}{n}\right)^{nt} - 1\right]}$

### 5. Present value of future payments

- $P = \frac{R \cdot \left[1 - \left(1 + \frac{r}{n}\right)^{-nt}\right]}{\left(\frac{r}{n}\right)}$

### 6. Mortgage Formula (Payments for present value)

- $R = \frac{P \cdot \left(\frac{r}{n}\right)}{\left[1 - \left(1 + \frac{r}{n}\right)^{-nt}\right]}$

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April 23, 2019

Score \_\_\_\_\_

3. (5 points) Julia got a new credit card with credit limit of \$13,500. Her interest rate is 12.99% compounded daily. Determine her effective interest rate. Write your final answer in percent form.

4. (6 points) Denise bought a Sleep Number mattress for \$1499. The mattress store financed her purchase at 10.99% simple interest for 3 years.

(a) How much interest will Denise pay?

(b) Denise decides to pay the total amount (principal + interest) in 36 equal monthly payments. How much is each payment?

5. (10 points) Amos made a profit of \$72,424 on the sale of some property. He deposits that money, all at one time, into an account earning 6.49% compounded quarterly. Then he forgets all about the account.

(a) How much money will be in the account after 25 years?

(b) How much of the account value is from interest?

6. (9 points) In order to plan for their retirement, a married couple decide to purchase an annuity that earns 8.5% compounded semiannually. They will make semiannual payments of \$3200 for 28 years.

(a) How much will the annuity be worth after the 28 years?

(b) After the 28 years, how much of their own money will they have deposited into the annuity?

(c) How much total interest will be earned?

7. (3 points) Briefly explain what an annuity is.

8. (6 points) How much would you have to invest now into a savings account earning 2.35% compounded monthly to make it worth \$5000 after 5 years?
9. (6 points) Mike and Jenny purchased new dining room furniture by agreeing to make monthly payments of \$39.30 for six years. Their financing arrangement called for an interest rate of 13.99% compounded monthly. How much would the furniture cost if Mike and Jenny had paid in cash at the time of purchase?

10. (25 points) A house sells for \$212,500. You make a 8% down payment and mortgage the remaining amount for 30 years at 3.925% compounded monthly.
- (a) How much is the down payment?
  - (b) What is the initial loan amount for your mortgage?
  - (c) What is the monthly payment?
  - (d) When the loan is paid off in 30 years, what will be the total interest paid?
  - (e) Compute the first 3 rows of the amortization schedule. Include at least the payment number, interest, amount paid to principal, and the outstanding balance.

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**Take-Home Problems. Due Thursday.**

11. (10 points) After winning \$115,000 on a game show, Carmen invests the money, all at once, into an account earning 8.9% compounded quarterly. Use guess and check to determine about how long it will take for the account value to grow to \$250,000.
12. (10 points) Sabrina and Tim are planning to buy a house. They can afford to make monthly mortgage payments of \$1050. The current interest rate for a 30-year, fixed-rate mortgage is 4% compounded monthly. How much can they borrow?