

Compound Interest

1. We placed \$2800 in a bank account with an annual compound interest rate of 5%. How much money is there in the account after 30 years if interest is compounded
 - a) annually
 - b) semi-annually
 - c) quarterly
 - d) monthly
 - e) daily
2. We placed \$1500 in a bank account with an annual compound interest rate of 6%. How much money is there in the account after 24 years if interest is compounded
 - a) annually
 - b) semi-annually
 - c) quarterly
 - d) monthly
 - e) daily
3. We placed \$100 in a bank account with an annual compound interest rate of 9%. How much money is there in the account after 50 years if interest is compounded
 - a) annually
 - b) semi-annually
 - c) quarterly
 - d) monthly
 - e) daily
4. We placed some money in a bank account with an annual compound interest rate of 4%, compounded monthly. After 15 years, the account contains \$3003.50. How much money did we deposit in the account initially?
5. We placed some money in a bank account with an annual compound interest rate of 5%, compounded daily. After 8 years, the account contains \$3610.12. How much money did we deposit in the account initially?
6. We placed some money in a bank account with an annual compound interest rate of 10%, compounded quarterly. After 25 years, the account contains \$5316.17. How much money did we deposit in the account initially?

Installment Buying

7. We want to buy a used car that is priced at \$7200. The dealership has a financing plan that includes a down payment of \$1500 and 8% APR for 18 months. Compute the monthly payment under this plan.
8. We want to buy a used car that is priced at \$8500. The dealership has a financing plan that includes a down payment of 2000 and 7.5% APR for 36 months. Compute the monthly payment under this plan.
9. We want to buy a used car that is priced at \$4000. The dealership has a financing plan that includes no down payment and 8% APR for 60 months. Compute the monthly payment under this plan.
10. We want to buy a used car that is priced at \$5600. The dealership has a financing plan that includes a down payment of \$1600 and 24 monthly payments of \$178.18. Compute the APR that the dealership charges.
11. We want to buy a used car that is priced at \$10 000. The dealership has a financing plan that includes a down payment of \$2000 and 48 monthly payments of \$199.08. Compute the APR that the dealership charges.
12. We want to buy a used car that is priced at \$3500. The dealership has a financing plan that includes a down payment of \$1000 and 12 monthly payments of \$214.02. Compute the APR that the dealership charges.

Answers

1. a) $\$2800 \cdot 1.05^{30} \approx \$12\,101.44$
 b) $\$2800 \left(1 + \frac{0.05}{2}\right)^{30(2)} \approx \$12\,319.41$
 c) $\$2800 \left(1 + \frac{0.05}{4}\right)^{30(4)} \approx \$12\,432.60$
 d) $\$2800 \left(1 + \frac{0.05}{12}\right)^{30(12)} \approx \$12\,509.68$
 e) $\$2800 \left(1 + \frac{0.05}{360}\right)^{30(360)} \approx \$12\,547.42$
2. a) $\$1500 \cdot 1.06^{24} \approx \6073.40
 b) $\$1500 \left(1 + \frac{0.06}{2}\right)^{24(2)} \approx \6198.38
 c) $\$1500 \left(1 + \frac{0.06}{4}\right)^{24(4)} \approx \6263.71
 d) $\$1500 \left(1 + \frac{0.06}{12}\right)^{24(12)} \approx \6308.37
 e) $\$1500 \left(1 + \frac{0.06}{360}\right)^{24(360)} \approx \6330.28
3. a) $\$100 \cdot 1.09^{50} \approx \7435.75
 b) $\$100 \left(1 + \frac{0.09}{2}\right)^{50(2)} \approx \8158.85
 c) $\$100 \left(1 + \frac{0.09}{4}\right)^{50(4)} \approx \8563.74
 d) $\$100 \left(1 + \frac{0.09}{12}\right)^{50(12)} \approx \8851.83
 e) $\$100 \left(1 + \frac{0.09}{360}\right)^{50(360)} \approx \8996.65

4. We write the equation $x \left(1 + \frac{0.04}{12}\right)^{12(15)} = 3003.50$ and solve for x

$$x = \frac{3003.50}{\left(1 + \frac{0.04}{12}\right)^{12(15)}} \approx 1650$$
 Answer: \$1650

5. \$2420

6. \$450

7. \$337.09

Soluton: From the table, at 8% APR for 18 months, we find the number 6.45.

amount financed: $\$7200 - \$1500 = \$5700$

amount owed: $\$5700 + \$367.65 = \$6067.65$

finance charge: $57 \cdot \$6.45 = \367.65

each payment: $\frac{\$6067.65}{18} \approx \337.09

All in one line: $\frac{57 \cdot 6.45 + 5700}{18} \approx 337.09$

8. \$202.19

Solution: From the table, at 7.5% APR for 36 months, we find the number 11.98.

$\frac{6500 + 11.98 \cdot 65}{36} \approx 202.19$

9. \$81.11

Solution: From the table, at 7.5% APR for 36 months, we find the number 21.66.

$\frac{4000 + 21.66 \cdot 40}{60} \approx 81.11$

10. 6.5%

Solution: We write the equation $\frac{40x + 4000}{24} = 178.18$ and solve for x .

$$\begin{aligned}\frac{40x + 4000}{24} &= 178.18 && \text{multiply by 24} \\ 40x + 4000 &= 4276.32 && \text{subtract 4000} \\ 40x &= 276.32 && \text{divide by 40} \\ x &= \frac{276.32}{40} \approx 6.91\end{aligned}$$

We look for this number in the APR table in the row corresponding to 24 monthly payments. We find it in the column corresponding to an APR of 6.5%.

11. 9%

12. 5%