Simple & Compound Interest - Questions

WARM UP

1. If I take $5000 and increase it by 6%, how much will I have?

2. My friend took an unknown amount, and increased it by 4%. Then she had $6760. How much did she start with?

3. What is the purpose of charging interest?

4. What is the purpose of earning interest?

5. Did you know that some religions have frowned on charging interest?

Extra question: What interest rate (percentage) do you think would be a fair amount to charge someone if they borrowed money from you?

Finance Day 1: Simple Interest

Terms:
Principal

Interest

Repayment Amount

APR (Annual Percentage Rate)

Treasury Notes (T-notes)

Formula: Simple Interest

$$I = P_0rt$$
$$A = P_0 + I$$

Skills:

- Find the amount of simple interest that would be charged/earned one time.
- Find the amount of simple interest that would be charged or earned over a period of time, at regular time intervals.
- Find the total repayment amount for a loan with simple interest.
- Find the amount of interest you would earn from a T-bill.
- Find the amount you would pay for a T-bill with a given face value, interest rate, and maturity time.
- Find the APR someone is charging if we know the time, the interest amount, and the loan amount.

Questions:

6. My uncle agreed to loan me 10,000 for a year. I offered 5% simple interest.
    a. What would I repay him?

    b. I actually repaid my uncle in 11 months. How much interest did I pay? How much did I save by repaying a month early?

7. If I borrowed 12,000 at 5% simple interest, for 2 years, how much interest should I pay in all? each year?

8. I bought a treasury bill for $3000 with a 3% interest rate, paid semi-annually, with maturity in 5 years. How much interest will I earn in all?

9. A 10 year T-note has a face value (ending value) of $5000. The interest rate is 1.8%. How much would it cost to purchase this T-note? (Answer: $4237.29)

10. I needed a $800 loan for a car repair. A friend agreed to loan me the money for a month, with $20 interest. What is the effective annual interest rate of this informal loan?

.

Finance Day 2: Compound Interest

WARM UP

1. What is 25% of $1000?

2. What is 0.25% of $1000?

3. What is 1/12 of 6%?

4. What is 1/12 of 8%?

5. How many times a year is bimonthly?

Formula: Compound Interest

$$P_N = P_0\left(1 + \frac{r}{k}\right)^{N \cdot k}$$

Skills:

- Find the ending amount when given the initial investment, interest rate, number of compounding periods, and number of years.
- Find the starting amount (principal) needed in a specific situation to get to a given ending value.

Questions:

6. You invest $6000 in an account earning 5% interest compounded annually. How much will you have 10 years from now? How much interest did you earn?

7. Redo the previous question but with interest compounded quarterly.

8. Redo the previous question but with interest compounded monthly.

9. Redo the previous question but with interest compounded daily.

10. For the previous question, how much interest did you earn?

11. How much more interest did you earn when interest was compounded annually compared to daily?

12. You are saving up for a house down payment. You estimate you need 20,000. How much should you invest now if you want to buy in 8 years, and you find an account that earns 7% interest compounded monthly. (Answer: $11442.78)