Finance Practice Problems

Ordinary Annuity (Sinking Fund)

Payment at the **end** of each period

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

Example: Joe deposits $22,000 at the end of each year for 7 years, in an account paying 6 % compounded annually, how much will he have on deposit after 7 years? *Ans:* **$184,664.43**

Practice 1: Mina deposits $500 at the end of each month for 10 years, in an account paying 5% compounded monthly, how much will she have on deposit after 10 years?

Practice 2: Napoleon deposits $1,200 at the end of each quarter for 10 years, in an account paying 8 % compounded quarterly, how much will he have on deposit after 10 years? *Ans:* **$72,482.38**

Practice 3-a: Jose wants to retire in twenty years and for this purpose he is depositing $200 at the end of each month in a sinking fund that pays 7.2% compounded monthly. If he will be doing this for twenty years, then how much money will be there for him when he retires? *Ans:* **$106,752.47**

Practice 3-b: If Joe wants to accumulate $130,000 in the twenty years period, and then what interest rate would provide that amount? *Ans:* **8.79%**

Practice 4: Find the amount of payment to be Joe needs to make into a sinking fund every quarter to accumulate $62,000 after 6 years: Knowing that money earns 8 % compounded quarterly. *Ans:* **$2,038.01**

Practice 5: Find the amount of payment to be made into a sinking fund to accumulate $75,000 for 4 and half year: money earns 6% compounded semiannually. *Ans:* **$7,382.54**

Annuity Due

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

Payment at the **beginning** of each period

Example: Joe deposits $500 at the beginning of each quarter end for 7 years, in an account paying 12 % compounded quarterly, how much will he have on deposit after 7 years? *Ans:* **$22,109.43**

Example: Joe deposits $500 at the end of each quarter for 7 years, in an account paying 12 % compounded quarterly, how much will he have on deposit after 7 years? *Ans:* **$21,465.46**

Practice 1: Cesar deposits $16,000 at the beginning of each year for 8 years, in an account paying 4.7 % compounded annually, how much will he have on deposit after 8 years? *Ans:* **$158,260.36**

Practice2: Cesar deposits $100 at the beginning of each quarter for 30 years, in an account paying 4 % compounded annually, how much will he have on deposit after 8 years? *Ans:*

Practice 3: Find the amount of payment to be Joe needs to make into an annuity fund every quarter to accumulate $62,000 after 6 years: Knowing that money earns 8 % compounded quarterly. *Ans:*

Practice 4: Find the amount of payment to be made into an annuity fund to accumulate $75,000 for 4 and half year: money earns 6% compounded semiannually. *Ans:*

Amortization $$R = P\left[\frac{\dfrac{r}{n}}{1-\left(1+\dfrac{r}{n}\right)^{-nt}}\right]$$ $P =$ Loan Amount $R =$ Periodic Payment $r =$ Interest Rate

$n =$ Compounding Period $t =$ Time

Example (4-year payment): A car costs $22,000. After a down payment of $4,000, the balance will be paid off in 48 equal monthly payments with the interest of 12 % per year on the unpaid balance. Find the amount of each payment. *Ans:* **$474.01**

Practice 1 (5-year term): A car costs $22,000. After a down payment of $4,000, the balance will be paid off in 60equal monthly payments with the interest of 12 % per year on the unpaid balance. Find the amount of each payment. ***Ans:***

Practice 2 (6-year term): A car costs $22,000. After a down payment of $4,000, the balance will be paid off in 72 equal monthly payments with the interest of 12 % per year on the unpaid balance. Find the amount of each payment. ***Ans:***

Practice 3 (Bad credit): A car costs $22,000. After a down payment of $4,000, the balance will be paid off in 48 equal monthly payments with the interest of 18% per year on the unpaid balance. Find the amount of each payment. ***Ans:***

Practice 4 (Good Credit and 4-year term): A car costs $22,000. After a down payment of $4,000, the balance will be paid off in 48 equal monthly payments with the interest of 6% per year on the unpaid balance. Find the amount of each payment. ***Ans:***

Practice 5 (Bad Credit and 5-year term): A car costs $22,000. After a down payment of $4,000, the balance will be paid off in 60 equal monthly payments with the interest of 18% per year on the unpaid balance. Find the amount of each payment. ***Ans:***

Practice 6 (Bad Credit and 7-year term): A car costs $22,000. After a down payment of $4,000, the balance will be paid off in 72 equal monthly payments with the interest of 18% per year on the unpaid balance. Find the amount of each payment. ***Ans:***

Additional Problems

1) How many days will it take for a sum of $1,500 to earn $25 interest if it is deposited in a bank paying 5% a year?(Use a 365-day a year.) ***Ans:*** **121.67 days**

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2) How long will it take an investment of $5,000 to triple if the investment earns interest at the rate of 8 % a year compounded quarterly? ***Ans:*** **13.87 years**

3) Today, the price of a gallon of milk is $4.25, assuming inflation rate to be 4.5 % a year. What will be the price of a gallon of milk 10 years from now? *Ans:* **$6.67**

4) Five and half years ago, Chris invested $10,000 in a retirement fund that grew at the rate of 10.82 % per year compounded quarterly. What is his account worth today? *Ans:* **$17,989.33**

5) 5 years ago, Johnny Cash invested a sum of money in a saving account with interest of 8 % per year compounded quarterly. His investment is now worth $22,289.22. How much did he originally invest? *Ans:* **$15,000**

6). Find the future value of ordinary annuity for $150 per month for 15 years at 10 % per year compounded monthly?

   Ans: **$62,170.55**

7) Find the present value of ordinary annuity for $150 a month at 8 % per year compounded quarterly for 10 years?
   Ans: **$4,103.32**

8) If you contribute $5,000 a year into a trust account, then how much will be in the account after 25 years if the account earns interest at the rate of 8.5 % per year compounded yearly? *Ans:* **$38,433.81**

9) Pope invested only $24,000 in a retirement fund 5 years ago. Today his investment is worth $34616. Find the effective annual rate of return on his investment over 5-yr period. *Ans:*

10) Find the rate of interest per year compounded on a daily basis that is equivalent to 9.6 % per year compounded monthly. *Ans:*

11) If $54,000 is invested at an interest rate of 9% for 7.5 years compounded continuously, then find its future value.
   Ans: **$106,057.78**

12) Find the monthly house payments for a loan of 188,000 at 5.74% for 15 years *Ans:* **$2,122.91**

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13) Find the future value of an annuity of $672 deposited at the beginning of each quarter for 7 years at 8% compounded quarterly.
    Ans: **$24,898.41**

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14) A company has ordered 20 new PCs at a cost of $1800 each. They will not be delivered for 5 months. What amount should the firm deposit in an account paying 8.1% to have enough money to pay for them? *Ans:* **$34,824.67**

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15) A pack-a-day smoker spends about $120 per month on cigarettes. Suppose the smoker invests that amount at the end of each month in a savings account at 6.7 % compounded monthly. What would the account be worth after 45 years? *Ans:* **$413,061.41**

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16) The Blues Clues family bought a house for $315,000. they paid $20,000 down and took out a 30-year mortgage for the balance at 7%. Find their monthly rent. *Ans:* **$1,962.64**

17) Find the total interest Blues Clues family will pay. *Ans:* **$391,550.4**

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18) Find the amount of each payment that must be paid into a sinking fund to accumulate $ 6,000 at 8% compounded monthly for 3 years. *Ans:* **$148.02**

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19) If money can be borrowed at 8 % compound monthly, which one is larger: $10,000 now or $15,000 in 5 years? Use present value to decider. *Ans:* **$15,000 in 5 years**

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20. One of **us** classmates needs to borrow $18,000 for 1 year. He has been offered a loan with interest compounded monthly and a compound amount of $19,952.42. Find the rate. *Ans:* **10.34%**

21) Billy Jean King deposited $6500 in an account paying 7.5 %compounded quarterly. After 3 years the rate drops to 4% compounded semiannually. Find the amount in her account at the end of 7 years. *Ans:* **$9,517.58**

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22) For one year, a student loan of $52,000 at 9% compounded semiannually resulted in a maturity value of $5,934.06. *Ans:***1.96 year, 1yr,11months**

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23) Bobby Cash deposited $10,000 at 8% compounded quarterly. Two years after she makes the first deposit, he adds another $20,000, also at 8% rate compounded quarterly. What total amount will he have 4 years after his first deposit? *Ans:* **$37,161.04**

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24) Bobby Cash deposited $10,000 at 8% compounded quarterly. Two years after she makes the first deposit, he adds another $20,000, also at 8% rate compounded quarterly. What total amount will he have 6 years after his first deposit? *Ans:* **$43540.08**

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25). John and Jill have $20,000 cash for the down payment of a house and they can afford a 15-year mortgage payment of $2,500/month. If the best mortgage rate that they can get is 7.5% then what will be the most affordable home that they can buy by their current budget plan? **Ans:$269,683.58 + 20,000 = $289,683.57 = $290,000**

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26) Adam and Eve need to borrow $115,000 to purchase a cave and are debating whether they should use a 20-year mortgage or 30-year mortgage. They also want to know the effect of two interest rates, a 6% and 8%, on

a) Monthly payment   b) Total cost and   c) Total interest paid

a) Monthly payment

Term of the mortgage	Interest rate	
	6%	8%
20 years	$823.89	$961.40
30 years	$690.00	844.10

b) Total cost

Term of the mortgage	Interest rate	
	6%	8%
20 years	$197,616.60	$232,736
30 years	$248,400	$303,876

c) Total interest paid

Term of the mortgage	Interest rate	
	6%	8%
20 years	$82,616	$117,736
30 years	$133,400	$188,876