

УТВЕРЖДАЮ

Заведующий каф. ИП

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**ФОНД ОЦЕНОЧНЫХ СРЕДСТВ ДИСЦИПЛИНЫ
ПРОФЕССИОНАЛЬНАЯ ПОДГОТОВКА НА АНГЛИЙСКОМ ЯЗЫКЕ
(МАТЕМАТИЧЕСКИЕ ОСНОВЫ ФИНАНСОВОГО МЕНЕДЖМЕНТА)**

I. Материалы текущего контроля

Задания для практических занятий:

Задача 1.

How much money you need to put in the bank at 20% per annum (per year) (assuming an annual capitalization) to get 250 thousand rubles in 2 years?

Задача 2.

A Bank considers a promissory note at 25% per year. until maturity there are 90 days, the nominal value of the note is 100 thousand Rubles. How much money will the bearer of the note get?

Задача 3.

We need to calculate the present value of receiving a single amount of \$1,000 in 20 years. The interest rate for discounting the future amount is estimated at 10% per year compounded annually.

Задача 4.

How much money do you need to put in the bank at 18% per year to receive 25 thousand Rubles in 3 years provided compounded quarterly?

Задача 5.

The promissory note in the amount of 20000 Rubles with a maturity date in the 27 of November 2017. was taken into the account by the bank the 11th of August of 2017 on a simple discount rate of 12% per year. Determine how much money has been paid into account?

Задача 6.

The nominal value of the promissory notes is 11,200 USD. The bank buys a company bill for 93 days before its maturity at an interest rate of 12% per annum.

What is the amount of discount on the note? and what's the amount the company will pay the bank?

Задача 7.

The Bank shall calculate the interest on the contributions on the basis of nominal rates 12% per year. Determine the effective (annual) rate with daily interest capitalization.

Задача 8.

The deadline for payment of a debt obligation is six months. The discount rate is 18%. What is the profitability of the operation, measured as a simple loan interest rates? What is the profitability of the operation if measured in the form of a complex loan interest rate?

Задача 9.

Determine at what interest rate is more favorable to place the capital in 10 million monetary units for 5 years:

- a) a simple 30% per annum;
- b) under the difficult interest rate of 25% per annum with quarterly compounding.

Задача 10.

Determine the value of the bank interest rate equivalent to the rate of interest of 40% per annum.

Задача 11.

Suppose that \$3659 is deposited in a savings account which earns 6.5% simple interest. What is the compound amount after five years?

Задача 12.

Find the effective annual simple interest rate which is equivalent to 8% interest compounded quarterly.

Задача 13.

Suppose you borrow \$15,000 and are required to pay \$15,315 in 4 months to pay off the loan and interest. What is the simple interest rate?

Задача 14.

Find the present value of \$32,000 in 4 months at 9% interest.

Задача 15.

Larry Parks owes \$6500 to Virginia Donovan. The loan is payable in one year at 6% interest. Donovan needs cash to pay medical bills, so four months before the loan is due, she sells the note (loan) to the bank. If the bank wants a return of 9% on its investment, how much should it pay Donovan for the note?

Задача 16.

A firm accepts a \$21,000 note due in 8 months, with interest of 10.5%. Two months before it is due, the firm sells the note to a broker. If the broker wants a 12.5% return on his investment, how much should he pay for the note?

Задача 17.

An investor bought a six-month \$8000 treasury bill on February 28, 2013 that sold at a discount rate of .135%. What is the amount of the discount? What is the price of the T-bill?

Задача 17.

1500 is deposited at the end of each year for the next 6 years in an account paying 8% interest compounded annually. Find the future value of this annuity.

Задача 18.

Allyson, a college professor, contributed \$950 a month to the CREF stock fund (an investment vehicle available to many college and university employees). For the past 10 years this fund has returned 4.25%, compounded monthly.

(a) How much did Allyson earn over the course of the last 10 years?

(b) As of April 14, 2013, the year to date return was 9.38%, compounded monthly. If this rate were to continue, and Allyson continues to contribute \$950 a month, how much would the account be worth at the end of the next 15 years?

Задача 19.

You are preparing to open a bank which will accept deposits into savings accounts and which will pay interest compounded monthly. In order to be competitive you must meet or exceed the interest paid by another bank which pays 5.25% compounded daily. What is the minimum interest rate you can pay and remain competitive?

Задача 20.

Suppose you have \$1000 to deposit in one of two types of savings accounts. One account pays interest at an annual rate of 4.75% compounded daily, while the other pays interest at an annual rate of 4.75% compounded continuously. How long would it take for the compound amounts to differ by \$1?

I. Задания для самостоятельной работы

Индивидуальное задание №1

1. The promissory note in the amount of 820 000 rub. is issued for 140 days with accrued interest at the rate of 28% per annum. It was taken into the account by the bank 45 days before the payment deadline with discount rate of 35% per year. Determine the profitability of the Bank

2. The bond was bought at the rate of 89% and it will be repaid in 5 years. The annual coupon payments are paid at the end of the year at the rate of 9% per annum of the nominal value of the bond. Calculate profitability of the operation.

Индивидуальное задание №2

1. According to the contract you have to pay 6400 monetary units in 2,5 years and 7200 monetary units in 5,5 years. We decided to change the contract by paying two equal installments after 3 and 4,5 years, counting from zero time. Find the size of each payment if the interest rate is 14% per annum with quarterly calculating.

2. Determine the value of the bank interest rate equivalent to the rate of interest of 60% per annum.

Индивидуальное задание №3

1. It is necessary to create the fund in the amount of 720 000 rub. in 5 years. Determine the amount of quarterly payments at the rate of 12% per annum, taking into account the capitalization.

2. The borrower takes a loan of 356 000 rub. for 8 years at 19% per annum. He's going to pay in equal installments every six months. What is the value of these payments?

Индивидуальное задание №4

1. What is the real profitability of the operation, if the bank interest rate adjusting for inflation is 18%, inflation rate over the 4 years was 1,7?

2. How much money it is necessary to put in the bank, to get the real value of savings became equal to 300 000 rub. by investing at 18% per annum for 3 years with monthly capitalization, if the inflation rate in the first year was 16%, in the second year it was 18.5% and in the third year there was deflation of 1%.

II. Материалы рубежного контроля

Контрольная работа № 1.

3. According to the contract you have to pay 5500 monetary units in 3 years and 6400 monetary units in 6 years. We decided to change the contract by paying two installments: after 4 years and the amount of 2 times more than 4 years after 7 years, counting from zero time. Find the size of each payment if the interest rate is 15% per annum with quarterly calculating.

4. It is necessary to create the fund in the amount of 580 000 rub. in 6 years. Determine the amount of quarterly payments at the rate of 11% per annum, taking into account the capitalization.

5. Three-month bond was purchased at 95%, then it was sold in 50 days for 97%. The purchaser held the bond to maturity. Who secured a greater profitability?

6. What is the real profitability of the operation, if the bank interest rate adjusting for inflation is 25%, inflation rate over the 5 years was 1.6?

7. The promissory note in the amount of 510 000 rub. is issued for 167 days with accrued interest at the rate of 15% per annum. It was taken into the account by the bank after 129 days. The Bank has considered the promissory note and paid the amount of 458 000 rub. Determine the discount rate and the profitability of the Bank.

Контрольная работа №2.

Proposed five solutions of the tasks. You need to find all the errors in the solutions.

Exercise 1. How much money do you need to put in the bank at 18% per year to receive 25 thousand Rubles in 3 years provided compounded *quarterly*?

Decision:

Let's use the formula for discounting when the interest is calculated several times a year:

$$P = \frac{S}{\left(1 + \frac{i}{m}\right)^{n \cdot m}}.$$

Future value $S = 25000$ rub., time $N = 3$ years, the number of charges per year $m = 3$ times, interest rate $i = 18\%$.

$$P = \frac{25000}{\left(1 + \frac{0,18}{3}\right)^{3 \cdot 3}} = 14741,6.$$

Exercise 2. The promissory note in the amount of 500 000 rub. is issued for 100 days with accrued interest at the rate of 20% per annum. It was taken into the account by the bank 20 days before the payment deadline with discount rate of 12% per year. Determine the profitability of the Bank.

Decision:

Profitability formula:

$$r = \frac{\text{profit}}{\text{capital investments}} \times \frac{T}{t} \times 100\%$$

The amount for which the Bank will consider the promissory note:

$$P_1 = S \left(1 - d \frac{t}{T}\right) = 500000 \left(1 - 0,12 \frac{80}{365}\right) = 495890,41 \text{ rub.}$$

Banking profit from payment of a promissory note

$$Pr = P \left(1 + i \frac{t}{T}\right) - P_1 = 500000 \left(1 + 0,2 \frac{100}{365}\right) - 495890,41 = 31506,85 \text{ rub.}$$

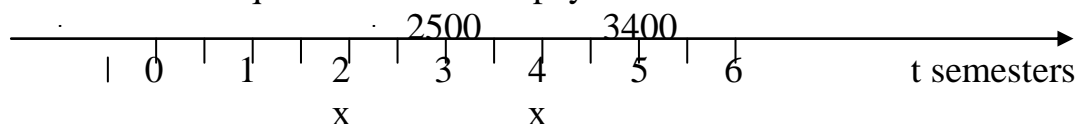
The profitability of the Bank:

$$r = \frac{31506,85}{495890,41} \cdot \frac{365}{20} \cdot 100\% = 116\%$$

Exercise 3. According to the contract you have to pay 2500 monetary units in 3 years and 3400 monetary units in 5 years. We decided to change the contract by paying two equal installments after 2 and 4 years, counting from zero time. Find the size of each payment if the interest rate is 14% per annum and the calculation is twice a year?

Decision:

Lets draw the problem situation on the time axis, placing payments under the original contract above the axis while payments under the new contract - below the axis. 'x' marks the required value of the payments.



Both contracts should be equivalent, so values of the amounts standing above the axis, and the amounts standing under the axis must be equal. Lets find the value of x from the equation:

$$\frac{2500}{\left(1 + \frac{0,14}{2}\right)^{2 \cdot 3}} + \frac{3400}{\left(1 + \frac{0,14}{2}\right)^{2 \cdot 5}} = \frac{x}{\left(1 + \frac{0,14}{2}\right)^{2 \cdot 1}} + \frac{x}{\left(1 + \frac{0,14}{2}\right)^{2 \cdot 4}},$$

$$x = \frac{\frac{2500}{1 + \frac{0,14}{2}} + \frac{3400}{1 + \frac{0,14}{2}}}{1 + \frac{0,14}{2}} = 2524,48 \text{ rub.}$$

So two payments should be 2524,48 rub. each.

Exercise 4. The borrower takes a loan of 200 000 rub. for two years at 14% per annum. He's going to pay in equal monthly installments. What is the value of these payments?

Decision:

The amount of payment is determined by the formula:

$$R = \frac{A \cdot i_c}{1 - (1 + i_c)^{-n}}.$$

It is necessary to consider that in the formula the interest rate is the annual rate and N is the number of years. Since we consider monthly payments, so the rate of interest and number of payments should be also monthly value.

$$R = \frac{20000 \cdot 0,14}{1 - \frac{0,14}{12}} = 9602,58 \text{ rub.}$$

Exercise 5. The inflation rate in the first year amounted to 7%, in the second year – 23 %, in the third year the inflation index was 1.2, the fourth and fifth years were accompanied by a 4% deflation. You should calculate the average annual rate of inflation.

Decision:

The inflation index for the entire period is determined by the formula:

$$I_n = \prod_{i=1}^N (1 + \alpha_{i-1, i}).$$

an inflation index linked to the inflation rate by the following expression

$$I_n = 1 + \alpha.$$

Lets find the inflation index for each year:

$$I_1 = 1,07; \quad I_2 = 1,23; \quad I_3 = 1,2; \quad I_4 = 0,96; \quad I_5 = 0,96.$$

Then the inflation index for all 5 years will be:

$$I = 1,07 \cdot 1,23 \cdot 1,2 \cdot 0,96 \cdot 0,96 = 1,4555.$$

The average annual inflation index is:

$$\bar{I} = 1,4555 / 5 = 1,078.$$

Then, the average annual inflation rate:

$$\bar{\alpha} = 1,078 - 1 = 0,078 = 7,8\%.$$

IV. Материалы итогового контроля

Вопросы к зачету

1. Describe how compound interest works.
2. Explain what is meant by the time value of money.
3. Call compound and discounting variables.
4. Define discounting and compare it to compounding.
5. Explain the difference between the nominal and the effective rate of interest.
6. Write formula for calculating the sum S accreted for all types of interest rates.
7. Cash flow model.
8. Simple interest loan rate. Calculate the accrued sum.
9. Cases of a simple interest change in the lending rates.
10. Compound lending rates. Calculate the accrued sum.
11. variable interest rates. Cases of change in the compound lending rates.
12. Calculation of interest multiple times a year. Effective and nominal interest rates.
13. Continues calculation of compound interest.
14. Mathematical discounting. Simple interest rates and discount.
15. Accounting of variable discount rates.
16. Discounting and its place in financial calculations. Interest and discount rates.
17. Accounting for inflation in financial calculation.
18. Equivalence of interest rates.
19. Annuities: types and parameters, formulas and examples of calculation.
20. The relationship between annuities, due and ordinary annuities.
21. Credit calculations: consumer credit and its repayment.
22. Debt repayment in equal fix-term payments.
23. Debt repayment, differentiated payment plan.
24. Different types of return of financial transactions; nominal and real, absolute and relative, current and complete.
25. Changing the terms of a contract. Financial equivalence of obligations.
26. The yield of securities.

Критерии оценки:

Оценка	Критерии
«отлично»	<ul style="list-style-type: none">•демонстрируются глубокие знания теоретического материала и умение его применять;•умение обоснованно излагать свои мысли, делать необходимые выводы.
«хорошо»	<ul style="list-style-type: none">•демонстрируются глубокие знания теоретического материала и умение его применять;•возможны единичные ошибки, исправляемые самим студентом после замечания преподавателя;•умение обоснованно излагать свои мысли, делать необходимые выводы.
«удовлетворительно»	<ul style="list-style-type: none">•неполное теоретическое обоснование, требующее наводящих вопросов преподавателя;•затруднения в формулировке ответа.
«неудовлетворительно»	<ul style="list-style-type: none">•отсутствие теоретического обоснования вопроса.