

Math 79: Practice Final

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Please note, this exam is only slightly longer than the actual exam.

1. If the interest on a \$2850 ordinary interest loan is \$93.10, and the annual interest rate is 9.8%, then find the term of the loan in months.
2. How much would have to be invested at 6.38% annual interest to have a future value of \$5000 after 10 years if
 - (a) the account earned simple interest?
 - (b) the account earned interest compounded monthly?
 - (c) the account earned interest compounded continuously?
3. Suppose Jim buys a new car for \$19,995 by paying 15% down and financing the balance at 8.75% annual interest for 5 years. What will his monthly payment be?
4. Maynard takes out an amortized loan at 2.25% annual interest for 4 years. If his monthly payment is \$280.95, find the dollar amount that Maynard financed.
5. Suppose you finance a \$230,450 loan over 30 years with a monthly payment of \$2238.28. Use the the matlab code provided to you to find the interest rate.
6. Lisa has found a house she likes for \$180,000. She has \$24,000 in savings for the down payment and closing costs. The closing costs are expected to be \$3000. The insurance for a year is \$650, and Lisa can assume taxes will be 3.5% of the value of the home. The bank will give her a 30-year fixed-rate amortized loan at 6.1%.
 - (a) What will Lisa's monthly payments be?
 - (b) Suppose Lisa will pay insurance and taxes in equal monthly installments. What is the total of the monthly mortgage payment and the extra monthly costs for insurance and taxes?
 - (c) If Lisa has an annual gross income of \$65,000, can she afford the monthly expenses?
7. If you plan to borrow \$78,500 at 4.8% annual interest with a 20-year fixed-rate amortized mortgage loan and there is a 2.5-point discount fee and a 1.5-point origination fee, what will your added costs be?
8. A small liberal arts college has two math 79 classes. The first class has 25 students, 15 of whom are female, and the other class has 18 students, 8 of whom are female. One of the classes is selected at random, and two students are randomly selected from that class for an interview. If both of the students are female, what is the probability they both came from the first class?
9. A fast-food restaurant requires that employees wear a uniform. Employees have three color options for shirts (red, yellow, white) and four color options for slacks (black, gray, navy, khaki). Suppose a shirt and a pair of slacks are each selected at random.
 - (a) How many uniform combinations are possible?
 - (b) Construct the probability tree diagram for the experiment of selecting a uniform.
 - (c) Find the probability the employee is wearing black slacks and a shirt that is not white.
 - (d) is khaki a color or fabric?
10. Suppose you won \$2 million dollars in the California lottery.
 - (a) Is it better to take a cash lump sum of \$1 million dollars (50% of winnings) or take 26 yearly payments of \$76,923? Why or why not?
 - (b) If you took the \$1 million and invested at 5% interest for 26 years, how much would it be worth?

- (c) Suppose you invested the \$1 million at 5% apr for 1 year, how much profit would you make in that one year?
- (d) Suppose you invested the amount for 5 years at 7.5% apr, how much profit would you make?

11. If we define the rate of change of a population to be

$$\frac{P_{m+1} - P_m}{t_{m+1} - t_m}$$

where P_m is the population at time t_m . If $t_m = m$ and the units of m are simply years. Describe qualitatively what the model means:

$$\frac{P_{m+1} - P_m}{t_{m+1} - t_m} = rP_m(1 - P_m)$$

Graph the population curves given this information.