

Name: \_\_\_\_\_

MATH 108

Fall 2022

HW 4: Due 09/20

*"I don't know if anybody's ever told you that half the time this business comes down to, 'I don't like that guy.'"*

*–Roger Sterling, Mad Men*

**Problem 1.** (10pt) Levy Tate is tracking the CPI to measure and predict inflation. The CPI last year was 296.17, while this year it 305.86.

- (a) What was the inflation rate from last year to this year?
- (b) If the inflation rate remains constant from this year to next year, what will be the CPI that Levy should hope to predict for next year?
- (c) Assuming the inflation rate is constant over the next year, if a certain good cost \$15.99 this year, what should Levy predict that it costs next year according to this data?

**Problem 2.** (10pt) Arty Fischel is attempting to compute his federal income tax for this year. Going online, as he is a single filer, he finds the following two charts to compute his federal income tax:

Taxable Income	Tax Owed
\$0–\$10,275	10% of taxable income
\$10,276–\$41,775	\$1,027.50 + 12% amount over \$10,275
\$41,776–\$89,075	\$4,807.50 + 22% amount over \$41,775
\$89,076–\$170,050	\$15,213.50 + 24% amount over \$89,075
\$170,051–\$215,950	\$34,647.50 + 32% amount over \$170,050
\$215,951–\$539,900	\$49,335.50 + 35% amount over \$215,950
$\geq$ \$539,901	\$162,718 + 37% amount over \$539,900

Tax Rate	Taxable Income
10%	Up to \$10,275
12%	\$10,276–\$41,775
22%	\$41,776–\$89,075
24%	\$89,076–\$170,050
32%	\$170,051–\$215,950
35%	\$215,951–\$539,900
37%	$\geq$ \$539,901

- Explain how these two charts convey the same information. Your explanation should include an explanation of how to use each chart to compute the federal income tax for a single individual with \$20,000 of taxable income.
- If Arty made \$365,000 last year as a software engineer, how much will he pay in federal income tax.

**Problem 3.** (10pt) Sue Flay is taking out a small business loan to open her dream bakery. The loan she takes out is for \$85,000 at a 2.89% annual interest rate, compounded monthly.

- (a) What is the effective interest rate for this loan?
- (b) How much does she owe after 2 years?
- (c) How long until Sue owes the bank \$150,000?

**Problem 4.** (10pt) Brock Lee is open a savings account to have enough money for community college. He places \$2,500 in the account, which earns 0.13% annual interest, compounded continuously.

- (a) What is the effective interest rate for this account?
- (b) How much is in his account after 4 years?
- (c) If the cost of a year at the college is \$21,714, how much should have Lee placed in the account to have enough for his first full year at the college in four years?

**Problem 5.** (10pt) Ray Gunne is comparing loan rates at two different banks. The first offers loans at a 7.99% annual interest rate, compounded semiannually, while the other offers a loan at 7.89% annual interest rate, compounded continuously. Which loan should he take? Justify your answer completely.

**Problem 6.** (10pt) Sue Render wants to be able to save \$500 in the next two years by depositing \$400 in a savings account. She can either choose a savings account that compounds interest quarterly or continuously. For both types of savings account, find the interest rate on the savings account she would have to secure to have the \$500 after 2 years. Does her plan seem feasible?