Math 123
Fall 2018
Dr. Lily Yen

Quiz 3

Show all your work

Name: _____
Number: _____
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Score: ___/21

Problem 1: Answer the questions. Write out steps for each.

a. Convert the fraction *one and three quarters* into a percent.

$175.0\,\%$

$1\frac{3}{4} = 1.75 = 175\,\%$

b. Find $35\,\%$ of 250.

87.50

$0.35 \times 250 = 87.5$

c. If you want to give 24 jelly beans from a pile of 80 jelly beans, what percentage should you give?

$30.00\,\%$

$\frac{24}{80} = 0.3000 = 30.00\,\%$

d. 98 is $49\,\%$ of what number?

200.0

If $0.49x = 98$, then $x = \frac{98}{0.49} = 200.00$

e. When you ordered 200-dollar worth of food and drinks in Les Verses in Montreal, how much in taxes do you need to pay? Hint: Québec has a $15\,\%$ service tax.

$30.00

$15\,\%$ of \$200 is $0.15 \times 200 = 30$.

Score: /5

Problem 2: Solve for the indicated variable.

a. Solve for I in $m = \frac{P+I}{n}$

If $m = \frac{P+I}{n}$, then $mn = P + I$, so $I = mn - P$.

b. Solve for x in $(1.1)^x = 5$. Provide accuracy to two decimal places.

If $(1.1)^x = 5$, then $\log\left((1.1)^x\right) = \log(5)$, so $x \log(1.1) = \log(5)$, so $x = \frac{\log(5)}{\log(1.1)} \approx 16.89$

c. Solve for r in $A = P(1 + r)^t$

If $A = P(1 + r)^t$, then $A/P = (1 + r)^t$, so $(A/P)^{1/t} = 1 + r$,

$$r = (A/P)^{1/t} - 1$$

Score: /7

Problem 3: Baby Nathanael was born in May this year. During the summer, his parents won a lottery worth over ten million dollars. Suppose they would like to put aside part of their winnings for Nathanael's university education in a guaranteed investment certificate (GIC) at 2.5 % compounded semi-annually. They would like to have at least \$60 000 from the entire GIC (interest plus principal) by the time Nathanael is ready for university in September the year he turns eighteen. How much should they have invested in this GIC for him before September of this year?

Note that 18 years is 36 semi-years.
If they invest P dollars, then $P(1 + 0.025/2)^{36} \geq 60000$. They therefore need $P \geq \frac{60000}{(1+0.025/2)^{36}} = \$38\,364.55$.

Score: /3

Problem 4: Suppose you are given the principal of \$12 400 you still owe in your home theatre system last month at an annual interest rate of 12 %. Suppose the minimum monthly payment is computed based on the finance charge plus 2 % of principal. Find this month's minimum payment due.

The interest rate is 12 % per year, so 1 % per month. You therefore have to pay (at least) 3 % of \$12 400 or $0.03 \times 12400 = \$372.00$.

Score: /3

Problem 5: A new Tesla costs \$100 000. Suppose you take out an add-on interest loan for 3 years at an annual interest rate of 5 %, what will be your monthly payments? Also find the finance charges per month.

The simple interest on \$100 000 at 5 % for 3 years is $\$100\,000 \times 0.05 \times 3 = \$15\,000.00$, so the monthly payments are

$$\frac{\$100\,000 + \$15\,000.00}{3 \times 12} = \frac{\$115\,000.00}{36} = \$3194.45$$

Monthly finance charges is $\$15\,000/36 \approx \$416.67$.

Score: /3