Math 123
Spring 2023
Dr. Lily Yen

Quiz 4

Show all your work

Name: _____
Number: _____
Signature: _____
Score: ___/21

Problem 1: Answer the questions. Write out steps for each. One mark per part except two marks for the last part.

a. Convert the fraction *nine and three tenths* into a percent.

$9\frac{3}{10} = 9.3 = 930\,\%$

930.0 %

b. Find 8 % of 278.

$0.08 \times 278 = 22.24$

22.24

c. Brian wants to share 18 mini-snack bars out of a box of 120 with his brothers. What percentage of his box of mini-snack bars does he want to share?

$\frac{18}{120} = 0.15 = 15\,\%$

15 %

d. If Janette finds in her drawer 40 % of her pens are Muji pens, and she counts 10 Muji pens in total, how many pens does she have in her drawer?

If $0.4x = 10$, then $x = \frac{10}{0.4} = 25$

25 pens

e. David's family attended *Love and Fate*, a concert by the Vancouver Brass Orchestra last fall. For the family dinner before the concert, David's grandmother paid $279 including taxes and an 15 % tip. What was paid for taxes and tip? Assume a 12 % service tax.

If the bill was $\$x$, then the tax was $0.12x$ and the tip was $0.15x$, so he paid $x + 0.12x + 0.15x = 1.27x = 279$, so $x = \frac{\$279}{1.27} \approx \$219.685$. Therefore the taxes and tip combined was $59.31.

$59.31

Score: /6

Problem 2: Solve for the indicated variable in each of the following.

a. Solve for r in $I = Prt$

If $I = Prt$, then divide both sides by Pt to get $r = I/(Pt)$.

b. Solve for x in $(1.15)^x = 8$. Provide accuracy to two decimal places.

If $(1.15)^x = 8$, then $\log\left((1.15)^x\right) = \log(8)$, so $x\log(1.15) = \log(8)$, so $x = \frac{\log(8)}{\log(1.15)} \approx 14.88$.

c. Solve for r in $A = P(1+r)^9$. The exponent is 9.

If $A = P(1+r)^9$, then $A/P = (1+r)^9$, so $(A/P)^{1/9} = 1 + r$, so

$$r = (A/P)^{1/9} - 1$$

Score: /5

Problem 3: Janette's grandmother is offered by her bank three options for a \$9000 guaranteed investment certificate (GIC):

a. 4.5 % compounded monthly;

b. 4.55 % compounded annually; or

c. 4.49 % compounded weekly. (Use 52 weeks per year.)

Compute the interest after one year in each case and decide which option earns Janette's grandmother the most.

a. $\$9000\left(1+\frac{0.045}{12}\right)^{12} = \$9413.458\,425$, so the interest is \$413.46.

b. $\$9000 \times 0.0455 = \$409.5$

c. $\$9000\left(1+\frac{0.0449}{52}\right)^{52} = \$9413.127$, so the interest is \$413.13.

Hence the 4.5 % compounded weekly (option a) is best.

Score: /5

Problem 4: Brian's friend, Tom, purchased a snowmobile and financed \$9500 at \$750 per month for 18 months. Assuming the add-on interest method, what was the amount of interest paid over 18 months? Find the annual interest rate charged on the loan.

Tom paid a total of $18 \times \$750 = \$13\,500$. Since Tom borrowed \$9500, the total interest paid was \$4000.
To find the annual interest rate, $4000 \div 9500 \div 1.5 \approx 0.2807$, so around 28 %.

Score: /3

Problem 5: If *Chancellor's Choice Financial* master card charges 21 % on unpaid balance, how much would it cost in finance charge to leave \$557 unpaid past the due date for 30 days? Hint: Credit card companies use 365 days a year. For the sake of simplicity, use simple interest.

$$\$557 \times \frac{0.21}{365} \times 30 \approx \$9.61$$

Score: /2