

- 1) The going rate for a home mortgage with a term of 30 years is 4.05%. The lending agency says that based on your income, your monthly payment can be at most \$1400. How much can you borrow?

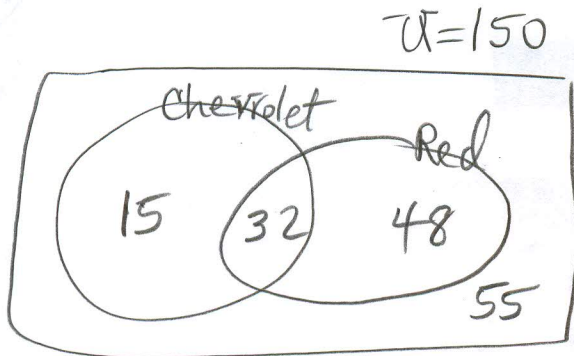
$$\begin{aligned} \text{Amount Borrowed} &= \frac{\text{Monthly Payment} \times ((1+r)^t - 1)}{r} \\ &= \frac{1400 \left(\left(1 + \frac{0.0405}{12}\right)^{12 \times 30} - 1 \right)}{\left(\frac{0.0405}{12}\right) \left(1 + \frac{0.0405}{12}\right)^{360}} \\ &= \boxed{\$291,483.06} \end{aligned}$$

- 2) Suppose you buy a three-year \$8500 CD at an APR of 0.75% compounded monthly. How much interest will you be paid by the end of the period?

$$\begin{aligned} \text{Balance after } t \text{ deposits} &= 8500 \left(1 + \frac{0.0075}{12}\right)^{3 \times 12} \\ &= \boxed{\$8693.36} \end{aligned}$$

$$\text{Interest} = 8693.36 - 8500 = \boxed{\$193.36}$$

- 3) Suppose that 150 cars were sorted by model and color. Assume that 15 were Chevrolets but not red, 48 were red but not Chevrolets, and 55 were neither red nor Chevrolets. Make a Venn diagram using Chevrolets and red cars, and include the numbers in each region of the diagram. How many red cars were observed? = 80



$$150 - (15 + 48 + 55) = 32$$

How many Red Cars were observed? = $32 + 48 = 80$

- 4) You want to save money to buy a new car. If you deposit \$250 a month for two years at an APR of 1.5% compounded monthly, how much money will you have saved after two years?

$$\begin{aligned} \text{Balance After } t \text{ deposits} &= \frac{\text{Deposit} ((1+r)^t - 1)}{r} \\ &= \frac{250 \left(\left(1 + \frac{0.015}{12}\right)^{24} - 1\right)}{\left(\frac{0.015}{12}\right)} = \$6087.05 \end{aligned}$$

- 5) What is the present value of an investment that will be worth \$6000 at the end of ten years assuming an APR of 3% compounded quarterly?

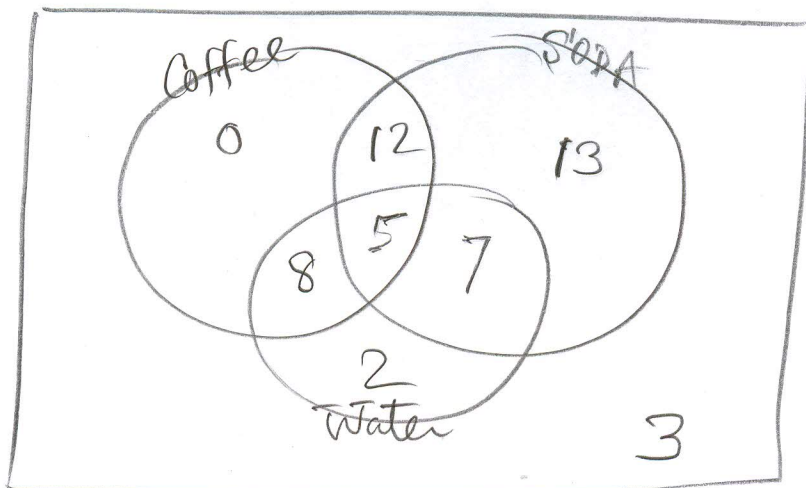
$$\text{Present Value} = \frac{\text{Future Value}}{(1+r)^t}$$

$$\text{Present Value} = \frac{\$6000}{\left(1 + \frac{0.03}{4}\right)^{10 \times 4}} = \boxed{\$4449.89}$$

- 6) A survey was conducted asking students how many drank coffee, soda, or water. The results are given in the table below:

Coffee	25
Soda	37
Water	22
Coffee and soda	17
Coffee and water	13
Soda and water, but not coffee	7
All three	5
None of these	3

Use C for coffee, S for soda, and W for water and make a Venn diagram. The completed diagram should show the number in each region

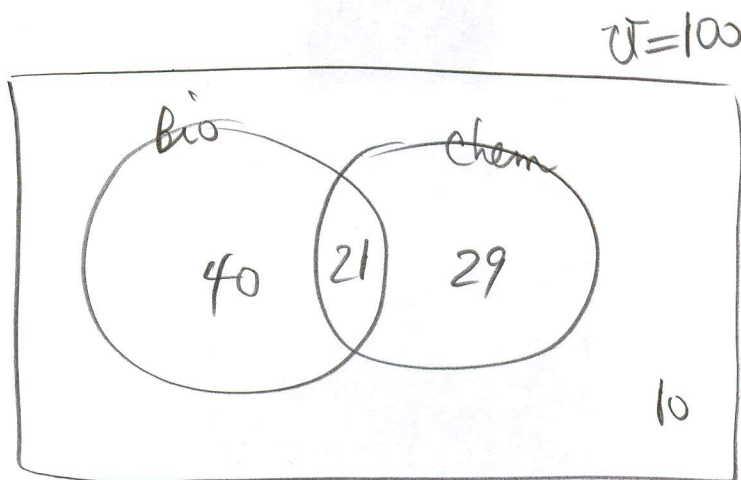


7) Find the interest paid on a 30-year mortgage of \$600,000 at an APR of 3.9%.

$$\text{Monthly Payment} = \frac{600000 \left(\frac{0.039}{12} \right) \left(1 + \frac{0.039}{12} \right)^{360}}{\left(\left(1 + \frac{0.039}{12} \right)^{360} - 1 \right)} = \$2830.01$$

$$\text{Interest} = 2830.01 \times 360 - 600000 = \boxed{\$418803.60}$$

8) Suppose that 100 students were given a biology exam and a chemistry exam. Assume that 40 passed the biology exam but not the chemistry exam, 29 passed the chemistry exam but not the biology exam, and 10 passed neither exam. How many passed the chemistry exam?



$$100 - (40 + 29 + 10) = 21$$

$$\text{How Many Passed Chemistry Exam?} \Rightarrow \boxed{21 + 29 = 50}$$

- 9) You want to save money to buy a new computer system. If you deposit \$49 a month for three years at an APR of 0.9% compounded monthly, how much money will you have saved after a year?

$$\text{Balance After a year} = \frac{49 \left(\left(1 + \frac{0.009}{12} \right)^{12} - 1 \right)}{\left(\frac{0.009}{12} \right)} = \boxed{\$590.43}$$

$$\text{Balance After 36 Deposits} = \frac{49 \left(\left(1 + \frac{0.009}{12} \right)^{36} - 1 \right)}{\left(\frac{0.009}{12} \right)} = \boxed{\$1787.35}$$

- 10) Suppose you want to borrow a principal of \$500,000 for a term of 20 years at an APR of 3.5%. How much is your monthly payment?

$$\begin{aligned} \text{Monthly Payment} &= \frac{\text{Amount Borrowed} \cdot r \cdot (1+r)^t}{(1+r)^t - 1} \\ &= \frac{500000 \left(\frac{0.035}{12} \right) \left(1 + \frac{0.035}{12} \right)^{20 \times 12}}{\left(\left(1 + \frac{0.035}{12} \right)^{240} - 1 \right)} = \boxed{\$2899.80} \end{aligned}$$