# MATH 10: UNIT 9.1: FINANCE - SIMPLE AND COMPOUND INTEREST

A) What is 'simple interest'?

-let's review some vocabulary:

i) principal:

 ii) interest:

 iii) annual interest rate:

 iv) time:

So, 'simple interest' is the interest (or extra) money you earn or pay on your principal

B) What is the formula for 'simple interest'?

Ex: go to [https://www.scotiabank.com/ca/en/0,,2,00.html](https://www.scotiabank.com/ca/en/0%2C%2C2%2C00.html), click on 'rates and prices' and then 'savings accounts'.



 i) If I had $6000 in this account, how much interest would I earn in 2 years? How much money would I have in total after the 2 years?

 ii) How much interest after 3 years? How much in total after 3 years?

Ex:



 i) how much interest did I earn on $5000 if I bought a 60-89 day GIC?

B) Other types of 'simple interest' questions:

 i) Peter Parker borrows $15,000 from Tony Stark to make new web fluid. Peter paid back $16,200 after 3 years.

 -How much interest did Peter Parker pay back?

 -what was the interest rate that Peter paid?

Try:

1) Borrowed $35,000 to buy a new Acura MDX. The dealership charges 2% interest per year. You pay off the loan in 5 years.

 a) How much interest did the dealership earn?

 b) How much did you pay for the MDX in total?

2) Berserker, a soldier from Fortnite, wants to upgrade the power of the grenade. Berserker checked his bank account and realized he earned $27 in 2 years at an interest rate of 3%.

 a) How much money did he have originally?

 b) It will cost $476 to upgrade the power of his frag grenade. Does he have enough money in his account?

C) What is 'compound interest?

-let’s compare how the interest accumulates between simple and compound interest:

  **SIMPLE INTEREST COMPOUND INTEREST**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| principal | % | Interest amount | Total amount | time | principal | % | Interest amount | Total amount | time |
|    |   |   |   |   |   |   |   |   |   |
|    |   |   |   |   |   |   |   |   |   |
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D) What is the 'compound interest' formula?



 P=

 r =

 t =

 n =

Note: semi-annually means n =

 quarterly n =

 monthly n=

 bi-monthly n =

 weekly n =

 bi-weekly n =

 daily n =

E) How to do 'compound interest' questions?

Ex: you borrowed $6500 at 5% compounded semi-annually for 5 years.

 i) what was the total amount you paid back?

 ii) what was the interest?

Ex: Isla is 14 years old. She wants $1,000,000 by the time she is 65. She invests in dividend paying blue chip stocks that have historically returned 5% annually. How much does she need to start with to reach her goal?



E) What is the ‘rule of 72’?

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WB pg 281 #1, 2, 4-11

**Math 10: unit 9.2B: gross and net pay**

A) What is 'gross pay'?

-refers to all the money (ex: overtime, bonuses, reimbursements, tips, commission, etc) your employers pays you BEFORE deductions (ex: income tax, medical insurance, employment insurance, retirement plans, etc)

Ex: i) Tim works at Sportchek. He earns $13.50 per hour. If he worked 8 hours on Saturday, what is his gross pay for the day?

 ii) Harry Potter works for the Ministry of Magic. He earns $56 per hour. On holidays, like Voldemort Day, he earns time and a half. If Harry worked 30 hours, and an additional 5 hours on Voldemort Day, calculate his gross pay.

 iii) Katniss also earns a commission based on her sales. If Katniss sold $2000 worth of goods on Saturday, and earns 5% commission on the sales, what is her new gross pay?

 iv) Black Panther earns a commission based on his sales of Vibranium: 2% on the first $1000, 4% on the $1001-$3000, and 6% on sales over $3001. How much would he earn if he sold:

1. $900 worth of Vibranium?
2. $1200 worth of Vibranium?
3. $8500 worth of Vibranium?

v)  Arya earns money based on the number of swords and axes she makes. She earns $500 for 25 swords and $300 for 60 axes. If Arya made 600 swords and 1200 axes for the Night’s Watch, how much money did she earn?

B) What is 'net pay'?

 net pay = gross pay - deductions

Ex: Astrid earns $75,000 gross pay as a computer programmer. She has deductions of $10,500 in taxes, $2600 in CPP, $800 in EI, and MSP of $1100. What is her net pay?

Ex: LeBron James earns $36,000,000. The income tax for California is 13%. What is his net pay?

Ex: Luke Skywalker earns 15% in tips in the cantina. If his tables charged a total of $5000, how much in tips does Luke earn?

 ii) From his tips, Luke pays out 2% to the cooks. How much do the cooks earn from Luke? What is Luke's net pay?

Do:

-handout

-WB: pg 286 #1, 2ace, 3-7 (look at example 3 from the workbook for extra help)

Math 10: unit 9.2A: types of income

A) How do we earn income?

-most people earn income via 4 ways:

 i) wages

 ii) salary

 iii) commission

 iv) piecework

Do: handouts

Math 10 Unit 9.3: tax rates

* 1. What is a 'tax'?

-according to Oxford dictionary (<https://en.oxforddictionaries.com/definition/tax>), a tax is:

*"A compulsory contribution to state revenue, levied by the government on workers' income and business profits, or added to the cost of some goods, services, and transactions"*

* 1. Describe the 3 main types of tax systems and give an example of each:

 i) regressive:

 -assesses tax as a percentage of the value of the asset that a taxpayer purchases or owns. This type of tax has no correlation with an individual's earnings or income level

-Regressive taxes tend to have a greater impact on low-income individuals than they do on high-income earners

Ex: sales tax: GST is 5% and can be considered a 'regressive tax' as it impacts lower income earners more than high income earners

 ie: Iphone XR: $1000. 5% GST on the phone is $\_\_\_\_\_\_\_\_\_. The \_\_\_\_\_\_has more impact on someone earning $30,000 than on another person earning $1,000,000.

 ii) proportional:

-usually refers to a 'flat tax' when talking about income tax

-everyone pays the same income tax rate, no matter the income level.

Ex: if the proportional tax is 8%, person earning income of $30,000 pays \_\_\_\_\_\_\_\_ income tax. A person earning $1,000,000 pays \_\_\_\_\_\_\_\_income tax.

 iii) progressive:

-increasing tax rates based on income.

Ex: Federal tax rates for 2019 (Canada):

* + 15% **on the first** **$47,630** of taxable income,**plus**
	+ 20.5% **on the next***$47,629* of taxable income (on the portion of taxable income over **47,630 up to $95,259**),**plus**
	+ 26% **on the next***$52,408* of taxable income (on the portion of taxable income over **$95,259 up to $147,667**),**plus**
	+ 29% **on the next***$62,704* of taxable income (on the portion of taxable income over **147,667 up to $210,371**)**, plus**
	+ 33%of taxable income **over**$210,371

From <[*https://www.canada.ca/en/revenue-agency/services/tax/individuals/frequently-asked-questions-individuals/canadian-income-tax-rates-individuals-current-previous-years.html*](https://www.canada.ca/en/revenue-agency/services/tax/individuals/frequently-asked-questions-individuals/canadian-income-tax-rates-individuals-current-previous-years.html)>

Ex: for BC:

|  |  |
| --- | --- |
| Taxable Income - 2019 Brackets | Tax Rate |
| $0 to $40,707 | 5.06% |
| $40,707.01 to $81,416 | 7.70% |
| $81,416.01 to $93,476 | 10.50% |
| $93,476.01 to $113,506 | 12.29% |
| $113,506.01 to $153,900 | 14.70% |
| Over $153,900 | 16.80% |

From <[*https://www2.gov.bc.ca/gov/content/taxes/income-taxes/personal/tax-rates*](https://www2.gov.bc.ca/gov/content/taxes/income-taxes/personal/tax-rates)>

* + What do we do with these tax rates?

-used to calculate the amount of income tax that goes to the federal government and the provincial government.

-let us use WB pg 289:

Ex: Mr. Chan earns $70000 a year. How much total income tax did he pay?

Step 1: Calculate the federal income tax paid:

…so: federal taxable income = gross income -federal basic amount - CPP - EI

 =

 step 2: Calculate his BC provincial income tax paid:

…so provincial taxable income = gross income - BC basic amount - CPP - EI

 =

 step 3: Calculate the total income tax paid:

…so total income tax paid = federal income tax + provincial income tax

Ex: BC premier earns $200000 per year. Calculate the total income tax paid.

 step 1) calculate the federal income tax

 step 2) calculate the BC provincial income tax

 step 3: total tax paid

-do WB pg 291 #1-2: left, 3: all

-WB pg 296 #1-4