

Name: NOTES KEY
Date: _____

Chapter 2 - FINANCE

Calendar of Chapter: See the 'Homework' link on the webpage

What You'll Learn

- 2.1 **Income** – identify, investigate, and do calculations for the four main payment styles of employment
- 2.1 **Commission Pay** – different types of commission & calculations involving each type
- 2.4 **Budgeting** – what it is, and how to build one
- 2.2 **Simple Interest** – what it is, and how to do calculations involving it
- 2.3 **Compound Interest** – what it is, and how to do calculations involving it

Can you describe what **interest** is?

Do you have a job? If so, how is your pay structure set up? Do you know how the pay structure is set up for one or more of your parent/guardian job(s)?

2.1A - Income

Focus: Identify, investigate, & calculate using the different payment styles for employment.

As a class, let's discuss, name, & record the 4 most popular payment structures for people at their job/career:

SALARY: paid a fixed yearly rate; divided and paid usually bi weekly or semi-monthly (twice per month) (every 2 weeks)

WAGE: get paid by the hour @ \$15/hr
sometimes overtime is 'time-and-a-half' or 'double time'

PIECEWORK: get paid by the item(s) for something you sell

COMMISSION: paid a percentage for how much you sell for a company

Which three will we focus on today?

focus today: SALARY, WAGE, PIECEWORK

How often are people usually paid?

weekly, biweekly, semi-monthly, monthly
(once every 2 weeks) (twice per month)

Name any benefits you may receive at jobs/careers:

medical, dental, pension, company car, bonus, etc.

What is a **pension**?

Money that you and your employer pay into so that you get a regular cheque to help you live after retirement

What is **CPP**?

Canada Pension Plan: A pension every Canadian who's employed pays into so that they get a monthly CPP cheque starting at 65.

What is **EI**?

Employment Insurance: Every Canadian who's employed pays so that if you lose your job, you get a regular cheque from the gov't for a period of time

What is **gross pay**?
net pay?

Gross Pay: Amount you earn BEFORE deductions
Net Pay: Amount you earn AFTER deductions.

Ex1 - An employee has a semi-monthly salary of \$2 687.50. The annual bonus for employees was 6% of the annual salary. How much was the **annual gross pay**?

$$\text{semi-monthly} = 2 \times 12 = 24 \text{ paycheques}$$

$$2687.50 \times 24 = 64500$$

$$6\% = 0.06, 64500 \times 0.06 = 3870$$

$$\begin{array}{r} \text{Annual gross pay} = 64500 \\ + 3870 \\ \hline \$68370 \end{array}$$

Ex2 -

Jenna worked 40 hours last week at \$12.55/hr. She had deductions of 14% income tax, 3% EI, 4% CPP, & 5% medical. What is her net pay?

40×12.55

Gross Pay		\$502
Deductions:		
Income Tax	502×0.14	70.28
EI	502×0.03	15.06
CPP	502×0.04	20.08
Medical	502×0.05	25.10
Net Pay		371.48

Ex3 - A graduate student has a salary of \$2000 per month as a teaching assistant, and worked 450 hours at the library at \$16/hr. How much did she gross for the year?

$$2000 \times 12 = \$24\,000$$

$$\$16 \times 450 = 7200$$

$$\$31\,200$$

Ex4 - Joe makes \$13.60 for the first 40 hours per week, then 'time-and-a-half' for any hours after. Last week, he worked 49 hours. As well, he does taxes for his friends at \$35 each, and did six of those. How much did he make last week?

$$13.60 \times 40 = \$544$$

$$13.60 \div 2 = 6.80$$

$$13.60 + 6.80 = \$20.40$$

$$\$20.40 \times 9 = 183.60$$

$$^b 35 \times 6 = \$210$$

$$\begin{array}{r} 544.00 \\ + 183.60 \\ 210.00 \\ \hline \$937.60 \end{array}$$

b) What payment styles does Joe have for each of his jobs?

a) \$937.60

b) wage and piecework.

2.1B - Commission Pay

Focus: To investigate the different types of commission pay structures for jobs/careers.

Warmup:

What are the three payment styles from last day's notes? Define each.

What is **commission**?

What kinds of commission styles exist in jobs/careers?

SALARY - fixed amount per year

WAGE - fixed amount per hour

PIECEWORK - paid by the item(s)

Paid a percentage of how much you sell for a company

- ① Straight Commission: employee earns a percentage of each sale
- ② Salary plus Commission: employee receives a fixed salary plus a percentage of each sale
- ③ Variable Commission: commission % can go up if certain goals are met
- ④ Draw Against Commission: employee is advanced money, which will be paid back in future by commission earnings
- ⑤ Residual Commission: employee continues to receive a % of a sale for long term partnerships

Ex1 - Evan earns straight commission of 12% at his chemical sales job. Last year, he does \$750 000 in sales. How much did he earn?

$$12\% = 0.12$$

$$750\,000 \times 0.12 = \underline{\underline{\$90\,000}}$$

Ex2 - Charlotte makes 9% commission and earns an **extra** 5% commission when sales exceed \$500 000. Last year, she did sales of \$810 000. How much did she earn?

$$500\,000 \times 0.09 = \$45\,000$$

$$\begin{array}{r} 810\,000 \\ - 500\,000 \\ \hline 310\,000 \end{array}$$

$$\begin{array}{r} 45\,000 \\ + 43\,400 \\ \hline \end{array}$$

$$\underline{\underline{\$88\,400}}$$

$$9\% + 5\% = 14\% = 0.14$$

$$310\,000 \times 0.14 = \$43\,400$$

Ex3 – Ernie earns an annual salary of \$55 000 with 5.5% commission on sales. Last year, he did \$475 000 in sales. How much did he earn?

$$475\,000 \times 0.055 = \$26\,125$$

$$+ 55\,000$$

$$\underline{\$81\,125}$$

Ex4 – Jenny takes a 'draw against commission'. She was given \$3000 biweekly. She did \$800 000 in sales at 10% commission. Will Jenny get more money at the end of the year, or will she have to pay back some money? How much?

biweekly

$$\frac{52}{2} = 26 \text{ cheques}$$

$$\$3\,000 \times 26 = \$78\,000 \text{ given}$$

$$10\% = 0.10$$

$$800\,000 \times 0.10 = \$80\,000 \text{ earned}$$

$$\begin{array}{r} 80\,000 \\ - 78\,000 \\ \hline \$2\,000 \text{ more} \end{array}$$

Jenny will get \$2000 more at the end of the year

Ex5 – Jeff makes a base salary of \$48 000/yr and earns 1% residual commission on his 3 highest existing accounts. Last year, his three highest accounts had sales of 1.2 million, 1 million, and \$850 000. How much did Jeff earn last year?

$$1\% = 0.01$$

$$1\,200\,000 \times 0.01 = \$12\,000$$

$$1\,000\,000 \times 0.01 = \$10\,000$$

$$850\,000 \times 0.01 = 8\,500$$

$$+ 48\,000$$

$$+ 30\,500$$

$$\underline{\$78\,500}$$

2.4 - Budget

Focus: Learn how to build and follow a personal budgeting system.

Warmup:

What is a budget & its purpose?

Discuss with those around you and explain:

Ex1 – a) Suppose you finished school, moved out on your own, & got a job with a wage of \$22.50/hr. Suppose you work 7.5 hrs/day, 21 days per month. Calculate your **gross pay** for the month.

b) After all deductions, your net pay is 68% of the gross pay. Calculate your monthly **net pay**.

c) With a partner, make a list of possible living expenses you would have living on your own and estimate the cost of each per month. Discuss as a class...

d) Subtract expenses from monthly net pay to see if you're under or over budget.

e) Financial advisors recommend trying to save at least 10% of your net pay. How much would this be? How does it affect your budget?

A recorded forecast of earnings and expenses

Purpose: to help people not overspend and save for the future

$$21 \text{ days} \times 7.5 \text{ hrs} = 157.5 \text{ hrs.}$$

$$\$22.50 \times 157.5 \text{ hrs} = 3543.75$$

gross pay per month

$$68\% = 0.68$$

$$3543.75 \times 0.68 = \$2409.75$$

net pay per month

Rent: \$900

food: \$300

etc etc...

over budget: deficit
under budget: surplus

$$2409.75 \times 0.10 = \$240.98$$

$$10\% = 0.10$$

Any money left over after the budget process is called
discretionary income

What are advantages to having a budget?

- keep control of spending
- not fall into debt
- save for the future

What are fixed expenses?

expenses that are the same cost each month

What are variable expenses?

expenses whose costs vary (change) each month

What are recurring expenses?

expenses that exist every month

Ex2 - List at least four expenses you would have if you bought your own automobile. Estimate each cost per month.

- approx \$
- ① insurance \$100
 - ② repairs \$100
 - ③ car payment \$200
 - ④ gas \$100

Ex3 - John's annual net income is \$34 250.

food:
 $34\,250 \times 0.25$

Expenses	%	\$
Food	25	8562.50
Housing	30	10275.00
Clothing	10	3425.00
Transportation	10	3425.00
Insurance	--	2400
Gifts	--	1200
Medical Insurance	--	900
Savings	--	3000
Total Expenses		33187.50

- b) Is John over budget?
- c) What is his discretionary income?

b) NO c) $34\,250 - 33\,187.50 = \$1062.50$ is discretionary

Ex4 - Michelle's budget

Annual Net Pay: \$30 570

- a) Calculate her annual expenses
- b) Surplus or deficit?
- c) If Michelle wanted to save \$150/mo for a vacay, where could she adjust her budget?

Monthly Expenses
 Rent: \$850
 Car Insurance: \$90
 Car Payment: 250
 Internet/TV: \$80
 Cell Phone: \$50
 Food: \$500
 Clothes: \$200
 Entertainment: \$300
 Miscellaneous: \$250
 Savings: \$100

a) add them up:
\$2670

b) Net pay per month:
 $30\,570 \div 12$
2547.50

DEFICIT of \$122.50

c) Reduce clothes, entertainment, misc budget by total of 372.50

vacay savings
↓
(150 + 122.50)
deficit
↓

2.2 - Simple Interest

Focus: To understand and apply the simple interest formula to situations.

Warmup:

- 1) Change 62% to dec
- 2) Change 8% to dec
- 3) Change 3.5% to dec
- 4) Change 0.09 to %

$$1) 62\% \div 100 = 0.62 \quad \text{OR} \quad \underbrace{62}_{100} = 0.62$$

$$2) \underbrace{8}_{100} = 0.08$$

$$3) 0.035$$

$$4) \underbrace{0.09}_{100} = 9\%$$

If you get a loan, you usually have to pay it back with interest.

a) What does this mean?

a) You have to pay the loan back plus extra money

b) There is no advantage to loan money if this wasn't the case

b) Why do you think this is the case?

Can you define Interest?

INTEREST: money paid at a particular rate for the use of money lent, or for delaying the repayment of a debt.

Sometimes, interest works against you. Describe a scenario where this is the case.

You borrow money, and then have to pay it back with interest

Sometimes, interest works for you. Describe a scenario where this is the case.

You invest your money or put it into an account, and you make interest on your money.

Why does a bank store money for you and pay you interest, yet they make huge profits?

they use your money and lend it out to others, who pay it back with interest, and you get a small share of that interest.

Ex1 - Suppose you invested \$100 at 4% interest for a year. How much would you now have?

\$100 invested = PRINCIPAL (starting value)

4% = interest rate = 0.04 in decimal

1 year $\$100 \times 0.04 \times 1 = \4

You now have $\$100 + \$4 = \$104$

Ex2 – (a) Suppose you invested \$42 000 at 6% for a year. How much would you now have?

$$42000 \times 0.06 \times 1 = 2520$$

$$42000 + 2520 = \text{\$}44520$$

b) What if you invested it at simple interest for 12 years? How much would you have?

$$42000 \times 0.06 \times 12 = \text{\$}30240$$

(OR 2520×12) \longrightarrow = 30240

$$42000 + 30240 = 72240$$

Here is the formula for **Simple Interest**:

$$I = Prt$$

I = interest \$ t = time (in years)
 P = principal \$
 r = interest rate

Ex3 – Use the formula to find out how much interest you would pay if you borrowed \$12 000 at 7.5% interest over 8 years.

$$P = \text{\$}12000 \quad I = Prt$$

$$r = 0.075 \quad I = (12000)(0.075)(8)$$

$$t = 8 \quad I = \text{\$}7200$$

You would owe back
12000 + 7200
= $\text{\$}19200$

You would pay $\text{\$}7200$ in interest

Sometimes, the situation is under 1 year. In that case, make the applicable **proper fraction** for t .

Ex4 – You borrow \$5000 for 7 months at 12% simple interest. How much will you pay back in total?

12 months in a year $P = 5000$ $I = Prt$

$$t = \frac{7}{12} \text{ (a little over half a year)}$$

$$r = 0.12 \quad I = (5000)(0.12)\left(\frac{7}{12}\right)$$

$$I = \text{\$}350$$

Total Payback = $5000 + 350 = \text{\$}5350$

Ex5 – Suppose you won the lottery and invested \$3 000 000 at simple interest at 5%. How much interest would you every week?

$$P = 3000000$$

$$r = 0.05 \quad I = Prt$$

52 wks per year $t = \frac{1}{52}$ $I = (3000000)(0.05)\left(\frac{1}{52}\right)$

$$I = \text{\$}2884.62$$

Ex6 – You make \$540 interest on \$4000 over 3 years. What is the interest percentage?

$$I = 540 \quad I = Prt$$

$$P = 4000 \quad 540 = (4000)(r)(3)$$

$$t = 3$$

$$\frac{540}{12000} = \frac{12000r}{12000}$$

$$0.045 = r$$

$$4.5\%$$

2.3 - Compound Interest

Focus: To understand and apply the compound interest formula to situations.

Warmup

Evaluate:

- a) 2^7
- b) 4^8
- c) $(1 + 0.075)^{30}$
- d) $(1 + 0.12)^4$

a) $2^7 = 128$ b) $4^8 = 65536$

c) $(1 + 0.075)^{30} = (1.075)^{30} = 8.755$

d) $(1 + 0.12)^4 = (1.12)^4 = 1.5735$

Use the exponent button on your calculator:
 x^y or y^x or \wedge or x^\square

From yesterday, simple interest is when you pay/earn interest on the principal (starting) value:

Can you describe what compound interest is?

$P = \$5000, r = 0.10$ (10%)

Ex: Year 1: 10% of \$5000 is \$500 so you make \$500 interest

Year 2: 10% of \$5000 is \$500 so you make \$500 interest

etc...etc...so you make \$500 interest each year

when you earn interest on the interest as well as the principal!

Ex: Year 1: 10% of \$5000 is \$500 so you make \$500 interest

Year 2: now have 5500; 10% of 5500 is \$550 interest

Year 3: now have \$6050; 10% of 6050 is \$605 interest

Year 4: now have 6655 etc...

This table shows the clear difference between simple and compound interest:

Year	Simple Interest			Compound Interest		
	P	I	Total	P	I	Total
1	5000	500	5500	5000	500	5500
2	5000	500	6000	5500	550	6050
3	5000	500	6500	6050	605	6655
4	5000	500	7000	6655	665.50	7320.50
5	5000	500	7500	7320.50	732.05	8052.55
6	5000	500	8000	8052.55	805.26	8857.81
7	5000	500	8500	8857.81	885.78	9743.59

**Remember: for compound interest, the interest added each year becomes part of next year's principal, so you make interest on the interest!!*

Ex1 - Eva invests \$30 000 for 3 years at 5% compd int. How much will she have?

Year 1: $(30\ 000)(0.05)(1) = \$1500$

Year 2: $(31\ 500)(0.05)(1) = 1575$

Yr 3: $(33\ 075)(0.05)(1) = 1653.75$

$30\ 000 + 1500 = 31\ 500$
 $31\ 500 + 1575 = 33\ 075$

$\$33\ 075 + 1653.75 = \$34\ 728.75$

Ex1 - continued
Or, you can find the answer using the compound interest formula.

Ex2 - Watch 'Act 1' of Fry's Bank.
What do we know so far?

Ex3 - Jesse invests \$3500 at 4% compd int over 9 years. How much will he have?

Ex4 - Fran invests \$40 000 at 4.75% over 14 years. How much more will he have if he uses compound interest rather than simple?

Ex5 - Maddy has \$6303.07 after investing her principal for 6 years at 7% compound int. How much did she start with?

Ex6 - Let's work out Fry's Bank & then watch the video solution.

Let's explore the Compound Interest Formula a bit further to see why it works:

$$A = P(1+r)^t$$

A = total amount
P = principal
r = interest rate
t = years

Using the formula:

$$A = P(1+r)^t$$

$$A = 30000(1+0.05)^3$$

$$= 30000(1.05)^3$$

$$= \$34728.75$$

$$P = \$0.93$$

$$2.25\%, r = 0.0225$$

$$t = 1000$$

$$A = P(1+r)^t$$

$$A = 3500(1+0.04)^9$$

$$P = 3500$$

$$r = 0.04$$

$$t = 9$$

$$A = 3500(1.04)^9$$

$$A = \$4981.59$$

Cmpd:

$$P = 40000$$

$$r = 0.0475$$

$$t = 14$$

$$A = P(1+r)^t$$

$$A = 40000(1+0.0475)^{14}$$

$$A = 40000(1.0475)^{14}$$

$$A = \$76597.82$$

Simple:

$$I = Prt$$

$$I = (40000)(0.0475)(14)$$

$$I = 26600$$

$$\text{Total} = 40000 + 26600 = 66600$$

$$\text{difference} = 76597.82 - 66600.00$$

$$A = 6303.07$$

$$t = 6$$

$$r = 0.07$$

$$A = P(1+r)^t$$

$$6303.07 = P(1+0.07)^6$$

$$6303.07 = P(1.07)^6$$

$$\frac{6303.07}{1.5} = \frac{P(1.5)}{1.5}$$

$$\$4202.05 = P$$

$$A = P(1+r)^t$$

$$A = 0.93(1+0.0225)^{1000}$$

$$A = 0.93(1.0225)^{1000}$$

$$A = \$4283508.45 \leftarrow \text{Wow!!}$$

How much would Fry have if it was simple interest instead?

$$I = Prt$$

$$I = (0.93)(0.0225)(1000)$$

$$I = \$20.93$$

$$\text{total} = 0.93 + 20.93 = \$21.86$$

$$A = P(1+r)^t$$

Why (1+r)?

Say $P = 1000$
 $r = 10\% = 0.10$

$$P \times r = 1000 \times 0.10 = 100$$

↑ just interest

$$P \times (1+r) = 1000(1+0.10)$$

$$= 1000(1.1) = 1100$$

← Principal PLUS Interest

$$P = 1000$$

$$r = 0.10$$

$$t = 3$$

$$A = 1000(1+0.10)^3 \leftarrow \text{why here?}$$

$$A = 1000(1.1)(1.1)(1.1)$$

$$= 1100(1.1)(1.1) \text{ After yr 1}$$

$$= 1210(1.1) \text{ After yr 2}$$

$$= 1331 \text{ after yr 3.}$$