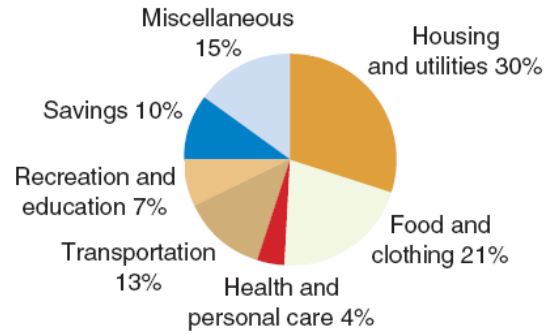


4. This pie chart shows Bella's expenses for one month. Bella spent \$2500 in one month for all of her expenses.



a) How much did she spend on housing and utilities?

30% of her monthly expense is on h & u
 $2500 \times 30 \div 100 = \boxed{\$750}$

b) How much did she spend on food and clothing?

21% of her monthly expense is on f & c
 $2500 \times 21 \div 100 = \boxed{\$525}$

c) How much did she spend on her top two expenses combined?

$750 + 525 = \underline{\underline{\$1275}}$

5. Ethan has just gotten a job as a carpenter. He estimates his annual income will be \$52000; however, his deductions are 35% of his salary.

He is currently living at home, but wants to know if he can afford to move out on his own. He has found a furnished bachelor's apartment that would cost \$1500 every month, utilities included.

He estimates he will spend \$200 on food and \$100 on phone and cable every month.

He will have to do laundry every week at a nearby laundromat that costs \$12 weekly.

His transportation costs are currently \$3600 for the year, and will stay the same in his new place.

a) Calculate his net income (NET INCOME = ANNUAL INCOME - TOTAL DEDUCTIONS)

Total deductions = $52000 \times 35 \div 100 = \$18,200$
 Net Income = $52,000 - 18,200 = \$33,800$
 Monthly = $\$2816.67$

b) Convert non-monthly costs to monthly costs.

Rent = \$1500/monthly
 Food = \$200/monthly
 Phone & Cable = \$100/monthly
 Laundry = \$12/weekly = \$52/monthly

Transportation = $\$3600/\text{yearly} = \$300/\text{monthly}$
 Savings = $\$6000/\text{yearly} \xrightarrow{\div 12} \$500/\text{monthly}$

c) Are there expenses that you think Ethan has forgotten to include? Explain.

Wifi apr \$50/month Going out/Entertainment ...

d) Prepare a personal monthly budget for Ethan, and determine whether Ethan can afford to move out.

INCOME	
Pay	\$2816.67
Total Monthly Income	\$2816.67
EXPENSES	
Rent	\$1500
Food	\$200
Phone & Cable	\$100
Laundry	\$52
Transportation	\$300
Savings	\$500
Total Monthly Expenses	\$2652
INCOME - EXPENSES	
	\$164.67

He can move out

RECALL: FUTURE VALUE

Use to find the value **at the end of an annuity**
(after all deposits are made & interest is accrued)

$$A = \frac{R[(1+i)^n - 1]}{i}$$

RECALL: PRESENT VALUE

Use to find the money needed **at the beginning of an annuity** to provide regular annuity payments

$$PV = \frac{R[1 - (1+i)^{-n}]}{i}$$

6. Charlie deposits \$500 every 3 months into his daughter's RESP. If the account earns 6% / a, compounded quarterly, how much will be in the account after 10 years?

* Lump sum at the end; therefore future value

Type: compounded quarterly

A: ?

R: \$500

i: 6%/year $\rightarrow \frac{0.06}{4} = 0.015$

n: 10 years $\times 4 = 40$

$$A = \frac{500((1+0.015)^{40} - 1)}{0.015}$$

$$= \$27,133.95$$

\therefore There will be \$27,133.95 in the account after 10 years.

7. Mikayla is setting up an income fund for her retirement. She wishes to receive \$3000 every month for the next 25 years, starting 1 month from now. The income fund pays 4.8% per year compounded monthly. How much must Mikayla deposit now to be able to receive the desired amount every month?

* Lump sum in the beginning; thus present value $PV = \frac{R(1 - (1+i)^{-n})}{i}$

Type: compounded monthly

PV: ?

R: \$3000

i: 4.8%/year = 0.004

n: 25 years $\times 12 = 300$

$$= \frac{3000(1 - (1+0.004)^{-300})}{0.004}$$

$$= \$523,562.99$$

\therefore She needs to invest \$523,562.99 the day she wants to start receiving monthly payments of \$3000 to last her 25 years.

8. Bilal receives a quarterly bonus of \$500 which he deposits into a savings account that pays him 4.8% interest compounded quarterly. How much will he have saved after 5 years?

Lump sum at the end; thus, future value

Type: compound quarterly

A: ?

R: \$500

i: 4.8%/year $\div 4 = 0.012$

n: 5 years $\times 4 = 20$

$$A = \frac{R((1+i)^n - 1)}{i}$$

$$= \frac{500((1+0.012)^{20} - 1)}{0.012}$$

$$= \$10,389.28$$

\therefore He will have \$10,389.28 saved after 5 years.

9. During her third year of post-secondary education, Angela moves back in with her parents and agrees to pay \$150 per week for rent. If her bank account has an interest rate of only 2.08% per year compounded weekly, and she plans to stay for 2 years, how much money must Angela have in her account before moving in? Assume she does not earn any other income during the 2 years.

Lump sum in the beginning; thus present value
Type: compounded weekly

PV: ?

R: \$150

i: 2.08% / year $\div 52 \rightarrow 0.0004$

n: 2 years $\times 52 = 104$

$$PV = \frac{R(1-(1+i)^{-n})}{i}$$

$$= \frac{150(1-(1+0.0004)^{-104})}{0.0004}$$

$$= \$15,276.98$$

\therefore She needs to have \$15,276.98 in her account

10. Katelyn wants to save up for a \$30,000 down payment. If she wants to have this money in 2 years, how much must she deposit every month into an account that makes 3.72% interest compounded monthly, to reach her goal?

Lump sum at the end; thus future value

Type:

A: \$30,000

R: ?

i: 3.72% / year $\div 12 \rightarrow 0.0031$

n: 2 years $\times 12 = 24$

$$A = \frac{R((1+i)^n - 1)}{i}$$

$$30000 = \frac{R((1+0.0031)^{24} - 1)}{0.0031}$$

$$30000 = R \cdot 24.8754$$

$$1206.01 \approx R$$

\therefore She must deposit \$1206.01 monthly.

11. Niloufar borrows now \$20,000 to buy a vehicle. She will repay the loan in equal monthly payments over 5 years, starting 1 month from now. She is charged interest at 6% per year compounded monthly. How much is Niloufar's monthly payment?

Lump sum in the beginning; thus, present value
Type: compounded monthly

PV: \$20,000

R: ?

i: 6% / year $\div 12 \rightarrow 0.005$

n: 5 years $\times 12 = 60$

$$PV = \frac{R(1-(1+i)^{-n})}{i}$$

$$20000 = \frac{R(1-(1+0.005)^{-60})}{0.005}$$

$$20000 = R \cdot 51.7256$$

$$\div 51.7256 \quad \div 51.7256$$

$$\$386.66 = R$$

\therefore She will pay \$386.66 every month for 5 years.

12. Bella wants to save \$8000 for a trip she plans to take in 3 years. What **regular deposits** should she make at the end of every 6 months into an account that earns 6% per year compounded semi-annually?