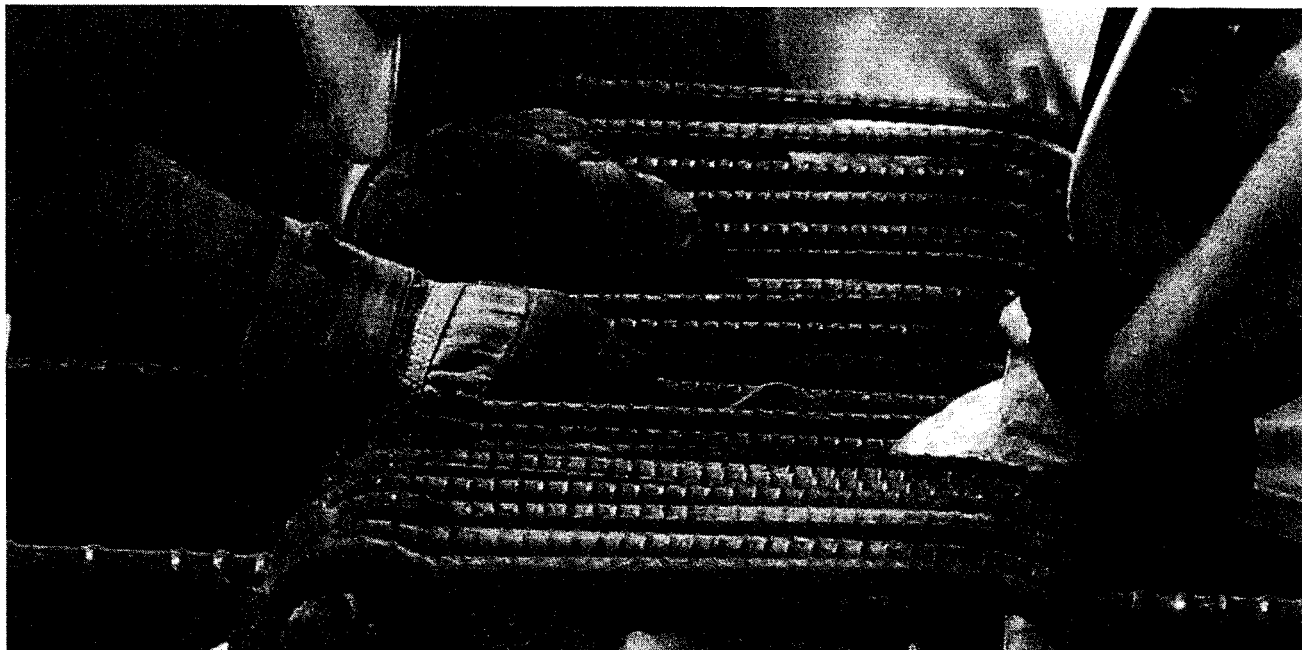


Chapter 2

Earning an Income



Many tradespeople such as electricians, welders, carpenters, and plumbers are employed by the construction industry. These men are installing rebar, the steel rods used to reinforce the walls and floors of concrete buildings.

2.1

Wages and Salaries

REVIEW: WORKING WITH MIXED FRACTIONS

A proper fraction is a fraction where the numerator is smaller than the denominator, for example, $\frac{2}{3}$ and $\frac{8}{12}$.

An improper fraction is one in which the numerator is greater than or equal to the denominator, for example, $\frac{3}{2}$ and $\frac{12}{8}$. Improper fractions can be changed to mixed numerals.

A mixed numeral is a number represented as a whole number and a fraction, for example, $2\frac{3}{4}$ and $12\frac{5}{8}$. In most cases, the fraction is simplified to its lowest terms.

Example 1

Change the improper fraction to a mixed numeral, expressed in its simplest form.

$$\frac{188}{12}$$

SOLUTION

To change an improper fraction to a mixed numeral, divide the numerator by the denominator and write the remainder as a fraction of the **divisor**.

$$188 \div 12 = 15, \text{ remainder } 8$$

When 188 is divided by 12, the **quotient** is 15 and the remainder is 8. The mixed numeral is $15\frac{8}{12}$. However, the fraction $\frac{8}{12}$ can be further simplified.

$$\frac{8}{12} = \frac{8 \div 4}{12 \div 4}$$

$$\frac{8 \div 4}{12 \div 4} = \frac{2}{3}$$

$$\frac{8}{12} = \frac{2}{3}$$

The simplified mixed numeral is written as $15\frac{2}{3}$.

ALTERNATIVE SOLUTION

First simplify the improper fraction, then divide the numerator by the denominator.

$$\frac{188}{12} = \frac{188 \div 4}{12 \div 4} \quad \text{Simplify.}$$

$$\frac{188 \div 4}{12 \div 4} = \frac{47}{3}$$

$$\frac{188}{12} = \frac{47}{3}$$

$$47 \div 3 = 15, \text{ remainder } 2 \quad \text{Divide.}$$

The quotient is 15 and the remainder is 2, so the mixed numeral is $15\frac{2}{3}$.

divisor: in a division operation, the number by which another number is divided; in $a \div b = c$, b is the divisor

quotient: the result of a division; in $a \div b = c$, c is the quotient

BUILD YOUR SKILLS

1. Change the improper fractions to mixed numerals.

a) $\frac{29}{7}$

b) $\frac{493}{9}$

c) $\frac{1005}{29}$

d) $\frac{45}{6}$

e) $\frac{398}{16}$

f) $\frac{1000}{15}$

Example 2

Change the mixed numeral $2\frac{3}{4}$ to an improper fraction.

SOLUTION

The mixed numeral can be broken up as follows:

$$2\frac{3}{4} = 2 + \frac{3}{4}$$

Change 2 to a fraction whose denominator is 4.

$$\frac{2}{1} = \frac{2 \times 4}{1 \times 4}$$

$$\frac{2 \times 4}{1 \times 4} = \frac{8}{4}$$

$$\frac{2}{1} = \frac{8}{4}$$

Now substitute this improper fraction into the expression above.

$$2\frac{3}{4} = 2 + \frac{3}{4}$$

$$2 + \frac{3}{4} = \frac{8}{4} + \frac{3}{4}$$

$$\frac{8}{4} + \frac{3}{4} = \frac{8+3}{4}$$

$$2\frac{3}{4} = \frac{11}{4}$$

BUILD YOUR SKILLS

2. Change the mixed numerals to improper fractions.

a) $5\frac{6}{11}$

b) $4\frac{7}{9}$

c) $15\frac{8}{17}$

d) $7\frac{5}{8}$

e) $12\frac{4}{5}$

f) $10\frac{7}{12}$

NEW SKILLS: WORKING WITH INCOME

A salary, a wage, or an income is the amount of money you receive for work you do. In some jobs, pay is calculated by the hour, while other jobs offer an annual income (paid weekly, biweekly, or monthly).

Gross pay is the amount you make before **deductions**. Deductions will be discussed in section 2.4.

For more details, see page 54 of *MathWorks 10*.

Example 3

Marcus works as an electrician and earns \$24.68/h. If it takes him 15 hours for one job, how much will he earn?

SOLUTION

Multiply his hourly wage by the number of hours he works.

$$\frac{\$24.68}{1 \text{ hour}} \times 15 \text{ hours} = \$370.20$$

He will earn \$370.20 on the job.

gross pay: the total amount of money earned before deductions; also called gross earnings or gross income

deduction: money taken off your paycheque to pay taxes, union fees, and for other benefits and programs

BUILD YOUR SKILLS

3. Martha works as a window dresser in her hometown of Victoria, BC. She charges \$16.72/h and it takes her 5 hours to finish the window at a local department store. How much will her gross pay be for the job?
4. Ben works as a carpenter for \$20.87/h. How much will he earn in a 40-hour work week?
5. Harpreet works in the trucking business. He charges \$35.75/h to haul materials for a local contractor. Last week he worked the following hours:
- 6 hours on Monday
 - 8 hours on Tuesday
 - 8 hours on Wednesday
 - 12 hours on Thursday

What was his gross income for the week?

Example 4

Last week, Chi worked 34 hours cutting lawns. His gross income was \$329.12. What was his hourly wage?

SOLUTION

Divide his gross income by the number of hours he works to calculate his wage per hour.

$$\frac{\$329.12}{34 \text{ hours}} = \frac{\$9.68}{1 \text{ hour}}$$

Chi earns \$9.68/h.

BUILD YOUR SKILLS

6. Last year, Liliana earned \$45 183.36 working in a Grande Prairie hair salon.
- What was her average monthly income?
 - What was her average weekly income?

7. If Janny works a 40-hour work week as a receiving clerk in the Powell River Hospital and earns \$552.88 per week, what is her hourly wage?
8. Emile is a flag person and earned \$321.25 last week. If he worked 32.5 hours, what was his hourly salary?

Example 5

Antonio is a cashier in a store that sells Caribbean products, such as ginger syrup, *ackee* (a type of fruit), and *dasheen* (also known as taro, a root vegetable). His time card for one week is shown below.

Time Card: Antonio					
Day	Morning		Afternoon		Total Hours
	IN	OUT	IN	OUT	
Monday	9:00	11:45	12:45	3:00	
Tuesday	8:45	10:45	2:00	5:30	
Wednesday	9:00	12:00	1:00	4:00	
Thursday	9:30	12:00	1:15	3:45	
Friday	9:00	11:30	12:15	3:15	

- a) How many hours did he work?
- b) If he earns \$15.85 per hour, how much did he earn that week?

SOLUTION

- a) On Monday, Antonio worked $2\frac{3}{4}$ hours in the morning and $2\frac{1}{4}$ hours in the afternoon for a total of 5 hours.

On Tuesday, he worked 2 hours in the morning and $3\frac{1}{2}$ hours in the afternoon for a total of $5\frac{1}{2}$ hours.

On Wednesday, he worked 3 hours in the morning and 3 hours in the afternoon for a total of 6 hours.

On Thursday, he worked $2\frac{1}{2}$ hours in the morning and $2\frac{1}{2}$ hours in the afternoon for a total of 5 hours.

On Friday, he worked $2\frac{1}{2}$ hours in the morning and 3 hours in the afternoon for a total of $5\frac{1}{2}$ hours.

Add these amounts together.

$$5 + 5\frac{1}{2} + 6 + 5 + 5\frac{1}{2} = 27$$

Antonio worked 27 hours.

- b) Multiply the number of hours he worked by his hourly wage.

$$27 \times \$15.85 = \$430.70$$

Antonio earned \$430.70 that week.

BUILD YOUR SKILLS

9. Monty works after school at a gas station in Swift Current, SK. He earns \$9.45/h. How much would he earn if the time card below represents his work week?

Time Card: Monty			
Day	IN	OUT	Total Hours
Monday	3:30	6:45	
Tuesday			
Wednesday	5:00	9:30	
Thursday	5:00	9:30	
Friday	3:30	7:00	

Hae-rin often works a split shift, where her work day is split into two time blocks.

10. Hae-rin works as a part-time warehouse technician. She gets paid \$12.76/h and keeps her own time card. How much did she earn during the week?

Time Card: Hae-rin					
Day	Morning		Afternoon		Total Hours
	IN	OUT	IN	OUT	
Monday	7:45	9:00	5:00	7:45	
Tuesday			4:00	8:00	
Wednesday	9:00	11:00			
Thursday	9:00	11:00	3:00	5:00	
Friday			3:00	6:00	
Saturday	9:00	12:00			

NEW SKILLS: WORKING WITH OVERTIME PAY

Many full-time jobs have a 40-hour work week, but others may have different regular hours. If you work more than the regular number of hours, it is classified as overtime and you will earn overtime pay for those extra hours. Overtime is often paid at “time and a half”—that is, 1.5 times your regular wage—but can be any other agreed-upon amount.

Example 6

Marcel works for a construction company and earns \$15.82/h for a $37\frac{1}{2}$ -hour work week. He is paid time and a half for any time that he works in excess of $37\frac{1}{2}$ hours. If he works $42\frac{1}{4}$ hours during one week, how much will he earn?

SOLUTION

Calculate Marcel’s overtime wage. It is time and a half, which means 1.5 times his regular wage.

$$1.5 \times \$15.82 = \$23.73$$

His overtime salary is \$23.73/h.

Calculate how many hours of overtime he worked by subtracting $37\frac{1}{2}$ from $42\frac{1}{4}$. (Hint: Change these values to decimals to make subtracting easier.)

$$42.25 - 37.5 = 4.75$$

He worked 4.75 h overtime.

Find his total income by calculating his regular income and then his overtime income. Add the two amounts together.

Regular income:

$$37.5 \times \$15.82 = \$593.25$$

Overtime income:

$$4.75 \times \$23.73 = \$112.72$$

Total income:

$$\$593.25 + \$112.72 = \$705.97$$

Marcel earned \$705.97 during the week.

BUILD YOUR SKILLS

11. Pete works in road construction as a grader operator. His regular work week is 40 hours. During the busy season, he often has to work overtime. For overtime hours worked Monday to Friday, he earns time and a half. If he has to work on Saturday, he earns double time and a half. How much will Pete make if he works 45.25 hours during the week and 5.75 hours on Saturday? His regular salary is \$15.77/h.
12. Ingrid works as a medical receptionist at a rate of \$11.82/h. She regularly works 35 hours per week, but her clinic wants to increase her work week to 42 h. She agrees to do this if they will pay her overtime, at time and a half, for the extra hours. If they agree to pay this amount, what will her weekly pay be?
13. Nathalie works as a playground supervisor for 8 weeks during the summer at a rate of \$15.27/h for a 40-hour week. If she averages 3 hours of overtime each week, paid at time and a half, how much will she earn during the summer?

4. Rita's annual income at her part-time job walking dogs is \$6758.00. Assuming she works the same amount of time each week, what is her weekly salary?
5. Abdul's time card is below. If his hourly wage is \$9.05, how much did he earn during the week?

Time Card: Abdul					
Day	Morning		Afternoon		Total Hours
	IN	OUT	IN	OUT	
Monday	9:05	12:15	1:20	5:00	
Tuesday	9:02	12:13	1:12	4:25	
Wednesday	8:58	12:14	1:05	4:19	
Thursday	9:02	12:12	12:58	4:14	
Friday	8:45	12:35	1:05	4:15	

6. Tandor has begun a job as an animal trainer in the movie industry. His starting wage is \$10.53/h for 30 hours per week. If he works more than 30 hours, he is paid 1.25 times his regular salary. How much will he earn if he works 35 hours in one week?

Alternative Ways to Earn Money

2.2

NEW SKILLS: WORKING WITH INCOME OPTIONS

Not all working people earn wages or a salary. There are other ways to earn income, including piecework, commission, salary plus commission, and contract work.

For more information, see page 64 of *MathWorks 10*.

Example 1

Greg works as a tree planter during the summer and he earns his income through piecework. He is paid \$2.50 for each seedling he plants. If he plants 45 seedlings in a day, how much will he earn?

SOLUTION

Multiply \$2.50 by 45.

$$\$2.50 \times 45 = \$112.50$$

He will earn \$112.50 that day.

BUILD YOUR SKILLS

1. Thomasina knits sweaters and sells them in her craft shop. She has been hired to knit sweaters for a team of 4 curlers and their spare. If she charges \$75.50 for a large sweater and \$69.75 for a medium sweater (because they require different amounts of wool), how much will she earn if she knits 3 large and 2 medium sweaters?

2. Patricia works in the garment industry. She is paid \$1.50 for each hem and \$2.25 for each waistband. How much does she earn by hemming 12 dresses and attaching 15 waistbands?

3. Jack cleans windows for extra income. He charges \$3.00 for a main floor window and \$5.00 for a second-storey window. How much will he earn if he cleans the windows on a house that has 7 main floor windows and 6 second-storey windows?

Example 2

Mary works as a flower arranger. She is paid \$143.75 for making 25 identical flower arrangements for a wedding. How much was she paid per arrangement?

SOLUTION

Find the unit rate. The easiest way to calculate this is to divide \$143.75 by 25.

$$\$143.75 \div 25 = \$5.75$$

She is paid \$5.75 per arrangement.

Example 3

Ming works in a store that sells classic Chinese furniture such as roundback armchairs and corner-leg stone stools. Ming works on commission at a rate of 6.5% of his gross sales. If he sold \$9865.00 worth of furniture last week, how much commission did he earn?

SOLUTION

Multiply his sales by his commission rate (expressed as a decimal).

$$\$9865.00 \times 0.065 = \$641.23$$

His commission was \$641.23.

BUILD YOUR SKILLS

7. Peter works in a sporting goods store and earns 12% commission on his sales. How much does he make on a bicycle that sells for \$785.95?
8. When selling a home, a real estate agent makes 5% commission on the first \$250 000.00 of the home's selling price and 2% on any amount over that. How much will Sue make if she sells a house worth \$375 900.00?

9. David earns a salary of \$375.00 per week plus 5% commission on his sales. If he sold \$6521.00 of goods, how much did he make?

Example 4

Olaf earned \$416.03 commission on his sales of \$9245.00. What was his rate of commission?

SOLUTION

You need to find what percent \$416.03 is of \$9245.00. Use proportional reasoning.

$$\begin{aligned}\frac{\$416.03}{\$9245.00} &= \frac{x}{100} \\ 100 \times \frac{\$416.03}{\$9245.00} &= \frac{x}{100} \times 100 \\ 100 \times \frac{\$416.03}{\$9245.00} &= x \\ 4.5 &\approx x\end{aligned}$$

His rate of commission was about 4.5%.

ALTERNATIVE SOLUTION

Divide Olaf's commission by his sales to find the rate of his commission as a decimal. Then multiply this by 100 to convert to a percentage.

$$\begin{aligned}\$416.03 \div \$9245.00 &\approx 0.045 \\ 0.045 \times 100 &= 4.5\end{aligned}$$

His rate of commission was 4.5%.

BUILD YOUR SKILLS

10. If Freddi earns \$6.86 on a \$95.95 sale, what was his rate of commission?
11. What is the rate of commission if you make \$592.00 on sales of \$12 589.00?
12. Don operates a small craft store in which he sells other people's crafts. He takes a 45% commission from the sales of all crafts. If he earned \$958.00 commission last week, how much did he sell?

Example 5

Gurpreet is figuring out what he should charge for repairing the steps on a client's house. The cost of materials will be \$785.96, and he will have to hire 2 workers for 8 hours each at a rate of \$12.85/h. He wants to earn at least \$450.00 for himself. What should he charge the client in the contract?

SOLUTION

Calculate all of Gurpreet's costs.

Cost of materials: \$785.96

Cost of labour:

$$2 \text{ people} \times 8 \text{ hours} \times \frac{\$12.85}{1 \text{ hour}} = \$205.60$$

Gurpreet's income: \$450.00

Add all of these costs to find the total cost of completing the repairs.

$$\$785.96 + \$205.60 + \$450.00 = \$1441.56$$

Gurpreet should charge \$1441.56.

Gurpreet would probably round this number. He might charge \$1450.00.

BUILD YOUR SKILLS

13. Marcel is bidding on a contract to lay concrete on a patio. He decides to calculate his actual costs and then add 20% profit for himself. He needs 3 cubic yards of concrete at \$100.00 per cubic yard delivered. He needs to pay 2 employees \$12.45/h each for 4 hours to do the job. What should he charge the client?
14. Tien has three employees working for her. Each employee is paid the minimum wage in BC, \$8.00/h, for an 8-hour day. They are also paid a commission of 12% on all sales they make. If the three employees made sales of \$785.96, \$452.87, and \$616.42, how much must Tien pay in total for the day?
15. Kate works at the front desk for a sheet metal company that recently completed 5 contracts. The contracts were worth \$5600.00, \$2800.00, \$7450.00, \$1900.00, and \$8900.00. Materials, salaries, and other expenses amounted to \$23 750.00. What was the percentage of the profits?

PRACTISE YOUR NEW SKILLS

1. A farmer pays his son \$8.25 for each bucket of wild blueberries he picks. He then sells them at a roadside stand for \$15.00 per bucket.
 - a) How much does his son earn if he picks 28 buckets of blueberries?

 - b) How much does the farmer earn?

2. A car company pays its salespeople 2% commission on the amount of their sales after cost. Joey sells a car for \$23 000.00 that cost the company \$15 000.00. How much did Joey make in commission?

3. Larissa earns a base salary of \$500.00 per week plus 4% commission on any sales. How much will she have to sell to earn \$750.00 in a week?

4. Paulette has been hired to make bridesmaids' dresses for a wedding. She knows that it will take her approximately 9.5 hours to sew each dress and that the material for each dress costs \$120.00. Paulette decides to charge \$240.00 per dress. At this price, what is her hourly rate?
5. Jeff's bid on a contract was \$15 980.00. His costs would be \$12 250.00, plus he would have to pay a labourer for 36 hours at \$12.45/h.
- a) Jeff's potential client indicated that another contractor offered a bid that was 10% lower. Would Jeff be justified in lowering his contract price to the same amount? Why or why not?
- b) Jeff calculated that he will put 50 hours into the job. If he lowers the bid, what will his hourly income be?

Additional Earnings

2.3

NEW SKILLS: WORKING WITH INCOME SUPPLEMENTS

A bonus is an extra amount earned for a job well done or for exceeding expectations, and is paid in addition to regular pay and/or overtime pay. It may be a lump sum or a percentage of earnings. Danger pay, isolation pay, a shift premium, and tips are also paid in addition to regular pay.

For more information, see page 72 of *MathWorks 10*.

Example 1

Marika works during the summer as a supervisor of a children's program at the local community centre. She has a good reputation with the children and her employer wants her to come back next year. Marika earned \$3600.00 during the summer and her employer offers her a 15% signing bonus if she will sign up for next year. If Marika signs up, how much will she get as a signing bonus?

SOLUTION

Find 15% of Marika's wages.

$$0.15 \times \$3600.00 = \$540.00$$

She will make \$540.00 as a signing bonus.

BUILD YOUR SKILLS

1. Chester wants to clear out his used car sales lot in Surrey, BC. To do so, he offers his employees an incentive for each car they sell. They will receive bonuses in the following amounts:

- \$50.00 for each car they sell for more than \$20 000.00
- \$40.00 for each car they sell between \$15 000.00 and \$19 999.00
- \$30.00 for each car they sell between \$10 000.00 and \$14 999.00
- \$25.00 for each car they sell below \$10 000.00

Gerry sells cars worth \$14 895.00, \$19 998.00, \$15 675.00, \$7250.00, and \$15 229.00. What is his bonus pay?

2. Raymond receives isolation pay for working in Wabasca, AB. If his regular pay is \$2245.00/month, and he is offered a bonus of 12% or \$275.00/month, which should he take?

3. Darren works as a logging machine operator. His salary is \$24.80/h. Due to the dangerous nature of his job, he makes 38% more per hour than Sean, who is a forklift operator. How much do Darren and Sean each make in an 8-hour day?

Example 2

Conchita works as a bus driver for a transit company. Since busy times of the day require more drivers than midday, the company requires that some employees work split shifts. The bus company offers a 12% shift premium for the second shift to anyone that has a 4-hour break between the end of one shift and the beginning of the next.

If Conchita earns \$17.82/h, how much will she earn during the week?

Time Card: Conchita		
Day	Shift 1	Shift 2
Monday	6:15–11:00	3:30–6:45
Tuesday	6:15–10:15	3:30–7:15
Wednesday	12:00–4:00	6:00–9:00
Thursday	3:30–7:30	
Friday	8:00–11:00	2:00–4:45

SOLUTION

Determine the days on which Conchita will receive a shift premium.

Monday: $4\frac{1}{2}$ hours – Premium

Tuesday: $5\frac{1}{4}$ hours – Premium

Wednesday: 2 hours – No premium

Thursday: no break – No premium

Friday: 3 hours – No premium

Calculate the shift premium rate by find 112% of her regular wage (as a decimal, 1.12).

$$1.12 \times \$17.82 = \$19.96$$

Calculate the hours worked in each shift and the income per shift.

Time Card: Conchita		
Day	Shift 1	Shift 2
Monday	$4.75 \times \$17.82 = \84.65	$3.25 \times \$19.96 = \64.87
Tuesday	$4 \times \$17.82 = \71.28	$3.75 \times \$19.96 = \74.85
Wednesday	$4 \times \$17.82 = \71.28	$3 \times \$17.82 = \53.46
Thursday	$4 \times \$17.82 = \71.28	
Friday	$3 \times \$17.82 = \53.46	$2.75 \times \$17.82 = \49.01

Calculate total income by adding.

$$\$84.65 + 3(\$71.28) + 2(\$53.46) + \$64.87 + \$74.85 + \$49.01 = \$594.14$$

ALTERNATIVE SOLUTION

Determine the number of hours for which she earned regular pay.

Monday: 4.75 hours

Tuesday: 4 hours

Wednesday: 7 hours

Thursday: 4 hours

Friday: 5.75 hours

Total: 25.5 hours

Add up the number of hours for which she received a shift premium.

Monday: 3.25 hours

Tuesday: 3.75 hours

Total: 7 hours

Calculate her shift premium rate by finding 112% of her regular wage.

$$112 \div 100 = 1.12$$

$$1.12 \times \$17.82 = \$19.96$$

Calculate her regular income and her premium income, and then add the two.

Regular income:

$$25.5 \text{ hours} \times \frac{\$17.82}{\text{hour}} = \$454.41$$

Premium income:

$$7 \text{ hours} \times \frac{\$19.96}{\text{hour}} = \$139.72$$

$$\$454.41 + \$139.72 = \$594.13$$

Conchita will earn \$594.13 during the week.

This answer differs from the first solution by \$0.01, due to rounding in the first solution.

BUILD YOUR SKILLS

4. Regular hours at the computer repair shop where Denise works are 9:00 am to 5:00 pm, Monday to Friday. Her boss has offered a shift premium of \$1.75/hour to anyone who will work after 5:00 pm or on Saturday. Last week, Denise worked the following hours:

- Monday: 9:00 am–5:00 pm
- Tuesday: 2:00 pm–8:00 pm
- Wednesday: 2:00 pm–7:00 pm
- Thursday: 12:00 pm–8:00 pm
- Saturday: 9:00 am–3:00 pm

If her regular pay was \$15.25/h, how much did she earn last week?

5. Drivers for the Fast Delivery Parcel Company are offered a shift premium if they drive the night shift (after 8:00 pm) to deliver parcels by 9:00 the next morning. Baljeet's schedule last week was as follows:

- Monday: 12:00 pm–7:00 pm
- Tuesday: 9:00 am–5:00 pm
- Wednesday: 6:00 pm–12:00 am
- Thursday: 12:00 pm–8:00 pm
- Friday: 3:00 pm–9:00 pm

His regular pay is \$12.75/h, and the shift premium is \$7.00/h. How much did he make last week?

6. Chen is offered isolation pay of \$1250.00 for a job in northern Manitoba. Alternatively, he can have a bonus payment of 28% of his salary. If his salary is \$532.00/wk, which is the better option if it takes 10 weeks to complete the job?

Example 3

Suzette works as a waitress in a local café in Selkirk, MB. Yesterday she made \$165.32 in tips. If this was 15% of the bills she collected, how much were the bills?

SOLUTION

Let x be the total of the bills. Use proportional reasoning.

$$\frac{15}{100} = \frac{165.32}{x}$$

$$100x \left(\frac{15}{100} \right) = \left(\frac{165.32}{x} \right) 100x \quad \text{Multiply both sides by the product of the denominators.}$$

$$15x = 165.32 \times 100 \quad \text{Simplify.}$$

$$15x = 16\,532$$

$$\frac{15x}{15} = \frac{16\,532}{15}$$

Divide both sides by 15 to isolate x .

$$x = \$1102.13$$

Her orders totalled \$1102.13.

f.

ALTERNATIVE SOLUTION

You know that \$165.32 equals 15% of the total orders. Use this to calculate 1% of the orders.

$$\$165.32 \div 15 \approx \$11.0213$$

Multiply this number by 100 to get 100% of the total orders.

$$11.0213 \times 100 = \$1102.13$$

Suzette's orders totalled \$1102.13.

BUILD YOUR SKILLS

7. Kirsten earns a base salary of \$8.20/h plus tips. On a typical day, she bills her customers \$950.00, and her tips average 15%. What is Kirsten's average daily income with tips for an 8-hour day?
8. Mandep is at a restaurant in Prince Rupert, BC. He has decided that 15% is too much to leave for a waiter who did not provide good service. He left \$3.00 on a meal that cost \$24.75. What percentage tip did he leave?
9. Rosita earned \$408.65 working 35 hours at \$8.21/h plus tips. How much did she make in tips?

In most restaurants, 15% is the average expected tip amount. A quick way to estimate a 15% tip is to round off your bill, find 10% by moving the decimal one place to the left, and then add half of that number to itself.

For example, if the bill is \$68.89, round up to \$70.00.

10% is \$7.00.

Half of \$7.00 is \$3.50.

$\$7.00 + \$3.50 =$
\$10.50

The total tip would be \$10.50. This is slightly more than 15% because you rounded up, so you may want to pay about \$79.00.

3. Restaurant sales totalled \$40 568.00 one month, and the average tip was 15%.
 - a) How much would each of the three waiters make in tips if they shared equally?

 - b) If they give 25% of their tips to the kitchen staff, how much will each waiter make?

4. Franco earns \$17.23/h, time and a half overtime, and a shift bonus of \$2.65 for split shifts. If he worked a total of 43.5 hours, 18 of which were split shifts, how much did he earn if a regular work week was 38.5 hours?

5. Horace works as a door-to-door salesman in rural Alberta and must use his own car. He is paid \$0.45/km for each kilometre he drives, plus 8% of sales. If he drove 2354 km and sold \$47 854.00 of merchandise, how much would his paycheque be?

2.4

Deductions and Net Pay

NEW SKILLS: WORKING WITH NET INCOME**taxable income:**

income after before-tax deductions have been applied, on which federal and provincial taxes are paid

net income:

income after all taxes and other deductions have been applied; also called take-home pay

Deductions are amounts of money taken off your gross pay for income tax (federal and provincial or territorial), union dues, disability insurance, employment insurance (EI), pension plans (including the Canada Pension Plan or CPP), and health or other benefits. Income tax is paid on your **taxable income**.

Each paycheque should list your gross pay, all deductions, and your **net income**. At the end of the year, your employer will supply you with a T4 slip that you will use to prepare your income tax return.

For more details, see page 79 of *MathWorks 10*.

Example 1

John's group life insurance is 1.5% of his salary of \$450.00 every two weeks. How much does he pay for group life insurance?

SOLUTION

Change 1.5% to a decimal and multiply by his salary.

$$1.5 \div 100 = 0.015$$

$$0.015 \times \$450.00 = \$6.75$$

He pays \$6.75 for group life insurance per paycheque.

Some deductions are taxable, and some are not. For example, union dues and company pension plans are before-tax deductions, and so they are not subject to federal and provincial taxes.

BUILD YOUR SKILLS

1. If the federal tax rate is 15%, how much is deducted from your \$750.00 paycheque?
2. If your short-term disability insurance rate is 0.5%, what do you pay if your paycheque is \$300.00?
3. If your Canada Pension Plan (CPP) contribution rate is 4.95% and your salary is \$1578.00 every two weeks, what will be the CPP deduction?

Income tax rates vary with province or territory, salary, and family circumstances.

Example 2

Jaar had a gross income of \$785.00. His net income was \$625.42. What percentage of his gross pay were his deductions?

SOLUTION

Calculate the amount of the deductions by subtracting his net income from his gross income.

$$\$785.00 - \$625.42 = \$159.58$$

Calculate what percentage \$159.58 is of \$785.00.

$$159.58 \div 785.00 \approx 0.2033$$

$$0.2033 \times 100 = 20.33\%$$

His deductions are about 20.3% of his gross pay.

BUILD YOUR SKILLS

4. Samara's monthly taxable income was \$3276.54. If she paid \$757.24 in taxes, what percentage of her taxable income did she pay?

5. Patricia's before-tax deductions amounted to \$75.47 on a gross salary of \$700.00.

a) If she paid \$93.68 in federal tax, what is her tax rate?

b) If she paid \$36.85 in territorial tax, what is her tax rate?

6. Hans paid \$37.51 Employment Insurance (EI) on his taxable monthly income of \$2168.21. What is the EI rate?

Example 3

Alphonso has a gross income of \$852.00 per week. His before-tax deductions include union dues of 2.5% of his gross income and a company pension plan contribution of 3%. His federal tax rate is 16.2% and his provincial tax rate is 5.4%. He pays 4.95% to the CPP and 1.8% for EI. Calculate his net income.

SOLUTION

Calculate Alphonso's taxable income by subtracting his union dues and his company pension from his gross income.

First, calculate the amount of his union dues and company pension.

Union dues:

$$2.5 \div 100 = 0.025$$

$$0.025 \times \$852.00 = \$21.30$$

Company pension:

$$3 \div 100 = 0.03$$

$$0.03 \times \$852.00 = \$25.56$$

Next, subtract these amounts from his gross income to find his taxable income.

$$\$852.00 - (\$21.30 + \$25.56) = \$805.14$$

Calculate the amount of taxes, CPP, and EI using his taxable income.

Federal tax:

$$16.2 \div 100 = 0.162$$

$$0.162 \times \$805.14 = \$130.43$$

Provincial tax:

$$5.4 \div 100 = 0.054$$

$$0.054 \times \$805.14 = \$43.48$$

CPP:

$$4.95 \div 100 = 0.0495$$

$$0.0495 \times \$805.14 = \$39.85$$

EI:

$$1.8 \div 100 = 0.018$$

$$0.018 \times \$805.14 = \$14.99$$

Alphonso's net income will be his taxable income minus these deductions.

$$\$805.14 - \$130.42 - \$43.48 - \$14.49 = \$576.89$$

Alphonso's net income will be \$576.89.

BUILD YOUR SKILLS

7. Randy works at two jobs. In one job, he earns \$325.00/week, and has deductions of \$56.67 federal tax, \$13.12 provincial tax, \$16.09 CPP, and \$4.14 EI. At his other job, he earns \$567.00/week and pays \$79.42 federal tax, \$16.82 provincial tax, and \$18.12 CPP. What is his net income?

8. As a part-time college instructor, Kathy teaches an introductory course on Mexican history. She has a biweekly gross income of \$3654.75. Her before-tax deductions include a short-term disability premium of 0.5%, union dues of 3.1%, and a pension amount of 4%. If she pays federal tax at a rate of 18.5%, provincial tax at a rate of 6.2%, CPP at 4.95%, and EI at 2.2%, what is her net income?

9. Consider the following pay statement.

Employee Name: Hank				
Company:	Pay Begin Date: 06/01/2010	Net Pay: ???		
	Pay End Date: 06/15/2010	Cheque Date: 06/15/2010		
General		Taxes Data		
Employee ID:	Job Title:	Description	Federal	
Address:	Pay Rate: \$575.00 Annual: \$29 900.00	Claim Code	1	
Hours and Earnings			Taxes	
	Current		Description	Current
Description	Rate	Gross Earnings	Federal	\$48.01
Regular	\$575.00/wk	\$575.00	Provincial	\$21.64
			CPP	\$25.13
			EI	\$9.95
			Total	\$104.73

- a) What is Hank's gross weekly income?
- b) What is his net income?
- c) What percent of his taxable income did he pay in federal taxes?

PRACTISE YOUR NEW SKILLS

1. Juliana has an annual salary of \$45 785.00.
 - a) How much does she pay in union dues if the rate is 2.4%?

 - b) How much does she pay in CPP if the rate is 4.95% and her taxable income is \$44 686.16?

2. Mario had \$685.74 deducted in federal tax. If his taxable income was \$2981.52, what was his tax rate?

3. What will be your net pay if you have deductions of \$105.30 federal tax, \$23.76 provincial tax, \$48.61 CPP, and \$14.12 EI from your paycheque of \$982.00?

CHAPTER TEST

1. If Brenda earns \$12.15/h and gets a 3.2% raise, how much will she earn per hour?
2. How much will you earn in a year as an apprentice metalworker if you are paid \$750.00 every two weeks?
3. What is your annual salary if your monthly salary is \$3568.00?
4. As a medical technician, Stephanie has been offered a job that pays \$53 000.00 per year and another job that pays \$25.50 per hour. Assuming a 40-hour work week and all other conditions being the same, at which job will she earn more?

5. Tommy made \$20.55 commission on a \$685.00 sale. What was his rate of commission?
6. Von works as a car salesman. He earns 8% commission on the after-cost profit when he sells a car. If he sells a car for \$12 795.00 that cost the dealer \$9280.00, how much does he make?
7. Jenny earns \$12.42/h, but earns double time and a half when she works on a statutory holiday. If she works a 6-hour shift on a holiday, how much will she earn that day?

8. Harold works 40 hours regular time at \$18.25 and 5.25 hours overtime at time and a half. How much does he earn?

9. Nanette crochets scarves and sells them for \$15.95 each. If material cost her \$7.52/scarf, how much does she make if she sells 9 scarves?

10. Cho bids \$5750.00 for a contract. If he hires 4 men for 2 days (8 h/day) at a rate of \$12.50/h and his materials cost him \$1675.84, how much does he earn?

11. How much CPP will be taken off your \$782.45 taxable income at 4.95%?

12. Padma has been offered isolation pay of \$125.00/week to work as a park ranger in northern Alberta.

a) How much will she make in a 40-hour work week if she is normally paid \$21.52/h?

b) Adding in the isolation pay, what is her hourly rate?