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**.

$188 \div 12 = 15$, 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.

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 $a \div b = c$, and c is the quotient

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

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

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

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.

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

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

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

$47 \div 3 = 15$, remainder 2   Divide.

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

BUILD YOUR SKILLS

1. Change the improper fractions to mixed numerals.

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

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

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

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

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

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

Example 2

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

SOLUTION

The mixed numeral can be broken up as follows:

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

Change 2 to a fraction whose denominator is 4.

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

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

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

Now substitute this improper fraction into the expression above.

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

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

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

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

BUILD YOUR SKILL

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.*

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

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.

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

He will earn _____on the job.

BUILD YOUR SKILL

1. 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?

2. Ben works as a carpenter for $20.87/h. How much will he earn in a 40-hour work week?

3. 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.

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

Chi earns _____/h

BUILD YOUR SKILLS

4. Last year, Liliana earned $45 183.36 working in a Grande Prairie hair salon.

    a) What was her average monthly income?

    b) What was her average weekly income?

5. 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?

6. 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

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 up the hours worked.

Antonio worked _____ hours.

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

$27 \times \$15.85 = $ _____

Antonio earned _ _____ that week.

BUILD YOUR SKILL

7. 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			**Total Hours**
	IN	OUT	
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.

8. 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.

$1.5 \times$ _____ = _____

His overtime salary is _____/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.)

$42.25 - 37.5 =$____

He worked _____/ h overtime.

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

Regular income:

$37.5 \times \$15.82 = \$$_____

Overtime income:

$4.75 \times \$23.73 = \$$_____

Total income:

_____ + _____ = _____

Marcel earned \$_____during the week.

BUILD YOUR SKILLS

9. 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.

10. 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?

11. 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?

PRACTISE YOUR NEW SKILLS

1. What is your daily income if you earn $10.75/h as a camp counsellor and you work 10 hours per day?

2. Lauren worked as an assistant at the National Métis Youth Conference. Her job was to provide support to people giving workshops. Lauren worked for $7\frac{1}{2}$ hours at a rate of $12.36/h. How much did she make?

3. Juanita has been offered a job that pays $497.35 for a 35-hour work week. A second company offers her a job at $16.75/h, but will only guarantee 30 hours per week. Which job would you advise Juanita to take?

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?