

Easy Way



Teach yourself...

**Perform calculations
for the workplace**

- ☒ Easy to follow
- ☒ Step-by-step instructions
- ☒ Written in plain English

A Cheryl Price Publication

Easy Way – Perform calculations for the Workplace

This book covers calculations (with practical exercises) required in the workplace such as GST, percentages, discounts, weights and measurements calculations, ratios and fractions etc.

It contains simple step-by-step exercises to guide you through the learning process.

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Sample Document

Section

1

Commonly Used Workplace Calculations

Learning Outcomes

At the end of this section you should be able to -

- ☐ Give examples of how decimal numbers are used in the workplace
- ☐ Round decimal numbers
- ☐ Use proper fractions, improper fractions and mixed numbers to describe objects
- ☐ Convert mixed numbers to improper fractions
- ☐ Determine whether two fractions are equivalent
- ☐ Convert fractions to decimals
- ☐ Use ratios to make comparisons
- ☐ Find an equal ratio
- ☐ Determine whether two ratios are equal
- ☐ Understand the concept of reducing/simplifying ratios and fractions
- ☐ Use proportions in workplace calculations

Sample Document

Decimals

An overview of the decimal system

Zero and the counting numbers (1,2,3,...) are *whole numbers*. However, not every number is a whole number. The decimal system lets us write numbers of all types and sizes, using a symbol called the decimal point. It is a system of counting that is based on 10.

A *decimal number* contains a whole number and a part of a number, with a decimal point between them. Digits to the left of the decimal point represent the whole number and digits to the right of the decimal point (generally called decimal places) represent part of a whole number.

For example, **54.276**, **112.355** and **0.02**.

Whole number	Decimal point	Decimal part (or places)
54	•	276
112	•	355
0	•	02

Decimals in the workplace

It's important to understand how decimals are used in numbers, because they are so much a part of our daily lives. In business, a huge number of calculations involving money include decimal points, such as pay slips, invoices and many others.



Decimal numbers are also used in the workplace to make calculations and express numbers that don't involve money, such as . . .

. . . the number of staff in a branch based on the hours they work. . .

Joe and Andrew each have 6 staff, but one of Andrew's only works 15 hours a week.



Joe



Andrew

How can I show in a report that I don't have as many man hours available to me as Joe does?

Solution:

A full-time worker = 40 hours

$15 \div 40 = .375$

Full time staff = 5

Part time staff = .375

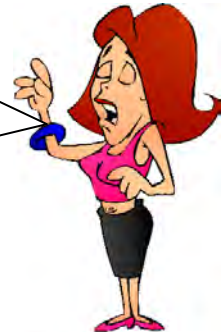
Andrew's total staff = 5.375

... or the average number of sales per staff member ...

The branch has sold 26 widgets this week, and there are 5 sales staff:

$$26 \div 5 = 5.2$$

I'm pleased to report that we've sold 5.2 widgets per sales staff member this week.



Exercise 1

What other workplace situations can you think of where decimal numbers might be used?

.....

.....

Rounding Numbers

A *rounded number* has about the same value as the number you start with, but it is less exact.

Examples

341 rounded to the nearest hundred is 300. That is because 341 is closer in value to 300 than to 400.

When rounding off to the nearest dollar, \$1.89 becomes \$2.00, because \$1.89 is closer to \$2.00 than to \$1.00

Rules for rounding

The general rules for rounding are:

If the number you are rounding ends with 5, 6, 7, 8, or 9, round the number **up**.

38 rounded to the nearest ten is 40

If the number you are rounding ends with 0, 1, 2, 3, or 4, round the number **down**.

33 rounded to the nearest ten is 30

Rounding decimal places

Although there are some occasions when a decimal number must be expressed in full, this high level of accuracy is not always required, and it is possible to round these numbers down to make them easier to read.

In the example below, the exact answer has three decimal places, ie there are three digits to the right of the decimal point.

Example

$$23.59 \times 2.6 = 61.334$$

The rounding rules (shown on the previous page) apply to decimal numbers, too. Follow the steps below to round the above decimal number (61.334) to two decimal places.

- | | | |
|---|--|-------|
| 1 | Which is the digit <i>nearest to the decimal point</i> that will be deleted? | 4 |
| 2 | Remove the digit from the number. | 61.33 |
| 3 | If the digit identified in Step 1 is 5, 6, 7, 8, or 9, round the last remaining number up. | - |
| 4 | If the digit identified in Step 1 is 0, 1, 2, 3, or 4, the last remaining number stays as it is. | 61.33 |

You can use these steps to round to any number of decimal places.

Example

0.3456 rounded to one decimal place (or the nearest tenth) is 0.3

0.3456 rounded to two decimal places (or the nearest hundredth) is 0.35

0.3456 rounded to three decimal places (or the nearest thousandth) is 0.346

Exercise 2

What is the number of Andrew's staff (see page 1), expressed as man hours, rounded to one decimal point?

Answer:

Exercise 3

Round the following numbers to one decimal place. The first one has been done for you.

Number	Rounded Number
.74	.7
.321	
.59	

Number	Rounded Number
.2445	
.362	
.07	

Fractions

Most people use fractions daily both in the workplace and at home, without even realising they are doing so. When you take a half hour lunch break, you have used a fraction! Similarly, you may stop at the petrol station when you have a quarter tank of petrol left, be responsible for completing two-thirds of a project, or need to make the first half of a recipe.

Fractions form the basis of many commonly-used calculations in the workplace, so it's important to have a basic understanding of them.

What is a fraction?

A fraction is part of a whole object. Fractions occur when a whole object is divided into an equal number of parts.

When you write a fraction, it usually looks like these examples - two numbers are displayed vertically or diagonally with a line between them.

$$\frac{1}{5}$$

$$\frac{1}{4}$$

$$2\frac{1}{2}$$

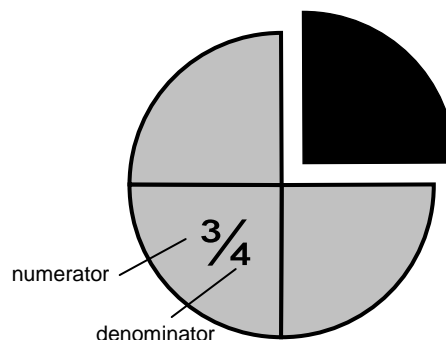
$$\frac{3}{6}$$

When you talk about a fraction, it can be described in a number of ways. For example, the fraction in the circle below could be read as three-quarters, three-fourths, three over 4, or three divided by four.

In a fraction, the top number is the *numerator* and the bottom number is the *denominator*.

The denominator shows how many equal sized parts create the whole object. In the example at the right, the whole object (a circle) has been divided into four equal parts, so the denominator is 4.

The numerator shows how many parts of the circle are being referred to. In the example at the right, the three grey parts are referred to, so the numerator is 3 for the $\frac{3}{4}$ fraction.



Exercise 4

What fraction describes the black section of the circle on the previous page?
(Circle your choice.)

$1/4$

$1/2$

$3/4$

$2/3$

In the example below, the two cats represent two-fifths of the total group, i.e.:

2 cats
5 animals in the total group

} = $2/5$



Exercise 5

What fraction of the group are dogs?
(Circle your choice.)

$5/5$

$3/5$

$4/5$

$2/3$

The type of fraction covered in the examples and exercises so far is the most common, and is known as a *proper fraction* – that's when the numerator is smaller than the denominator.

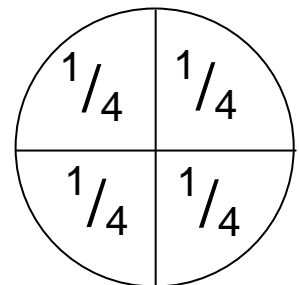
There are other types of fractions that you may need to use in the workplace.

Improper fractions and mixed numbers

When the numerator and denominator of a fraction are the same, (known as an *improper fraction*) it describes a whole object.

For example, if you have four equal parts and there are four parts in the whole, you have one whole object.

In the example at the right, the fraction $4/4$ could be used to describe the whole object (circle), but it would be more usual to refer to it by the *whole number* 1. The whole number is calculated when you divide the numerator by the denominator.



Example

$$4/4 = 1$$

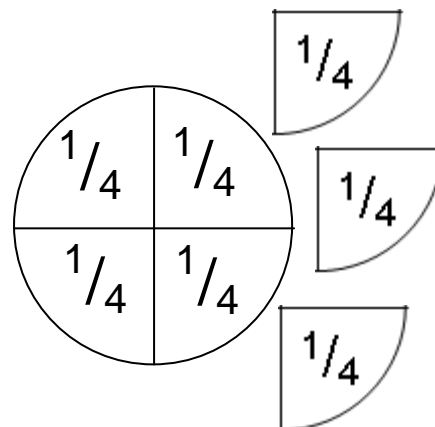
(4 divided by 4 is equal to 1)

If you have *more* than one whole object, you could show the number in two ways –

An *improper fraction*, where the numerator is bigger than or equal to the denominator - $\frac{7}{4}$ describes the object at the right;

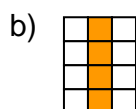
OR

A *mixed number*, where both a whole number and a proper fraction are used, - $1\frac{3}{4}$ also describes the object at the right.



Exercise 6

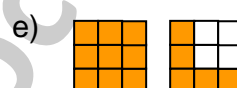
1 What fractions do these diagrams show?



.....

.....

.....



.....
Improper
fraction

.....
Whole
number

.....
Improper
fraction

.....
Mixed
number

2 Write these fractions using numbers:

Three quarters

One half

Seven thirtieths

Eight hundredths

Four ninetieths

Converting a mixed number to an improper fraction

The following steps show how to convert a mixed number to an improper fraction, using the example at the top of the previous page, (i.e. converting $1\frac{3}{4}$ to $\frac{7}{4}$).

It's important to revise the names of each part of a mixed number so that you can easily understand these instructions.

Numerator

Whole number

$1\frac{3}{4}$

Denominator

1 Multiply the whole number by the denominator of the fraction.	$1 \times 4 = 4$
2 Add the numerator of the fraction to the result.	$3 + 4 = 7$
3 Write the result over the original denominator.	$\frac{7}{4}$

Exercise 7

Convert the following mixed numbers to improper fractions.

- | | |
|-----------------------|------------------------|
| $2\frac{1}{3}$ | $9\frac{11}{13}$ |
| $5\frac{1}{13}$ | $3\frac{1}{6}$ |
| $13\frac{2}{5}$ | $7\frac{1}{4}$ |
| $4\frac{3}{4}$ | $8\frac{1}{9}$ |

Equivalent fractions

Two fractions that mean the same thing are called *equivalent fractions*. To find out if two fractions are equivalent, use a calculator to divide the numerator of one fraction by its denominator and then divide the numerator of the second fraction by its denominator. If both answers are the same, then they are equivalent.

Exercise 8

Complete the following table to show whether each set of fractions is equivalent or not. (*The first one has been completed for you as an example.*)

Determine whether or not these fractions are equivalent	Complete your calculations here	Are the fractions equivalent?
$\frac{3}{7}$ and $\frac{18}{42}$	$3 \div 7 = .428$ and $18 \div 42 = .428$	Yes
$\frac{6}{12}$ and $\frac{16}{24}$		
$\frac{12}{24}$ and $\frac{3}{6}$		
$\frac{6}{12}$ and $\frac{3}{6}$		

Converting fractions to decimals

One of the main reasons that you need to have an understanding of fractions is so that you can change them into decimal numbers. Although fractions are used in many areas of day-to-day life (think of a cake recipe!) decimals are generally used in the workplace, rather than fractions.

It's easy to change a fraction to a decimal number – just use a calculator to divide numerator of the fraction by its denominator.

Example

$$\frac{3}{4} = .75$$

(3 divided by 4 equals .75)

Try it – every fraction can be divided to convert it into a decimal number.

Exercise 9

Convert the following fractions into decimal numbers, rounded to two decimal places.
(The first one has been done for you.)

Fraction	Equivalent Decimal
$\frac{3}{4}$.75
$\frac{5}{12}$	
$\frac{7}{30}$	
$\frac{1}{2}$	

Fraction	Equivalent Decimal
$\frac{3}{6}$	
$\frac{8}{100}$	
$\frac{4}{90}$	
$\frac{4}{10}$	

Convert these mixed numbers into decimal numbers, rounded to two decimal places.

Mixed Number	Equivalent Decimal
$1\frac{3}{4}$	1.75
$2\frac{3}{12}$	
$8\frac{7}{15}$	
$4\frac{1}{2}$	

Mixed Number	Equivalent Decimal
$2\frac{3}{7}$	
$6\frac{8}{12}$	
$6\frac{5}{10}$	
$3\frac{4}{5}$	

Ratios and Proportions

What is a ratio?

A ratio is a pair of numbers used to make a comparison between two things.

In the illustration below, the ratio of cats to dogs is 3:6 – ie 3 cats to 6 dogs.



When you talk about this ratio, you would say ... 3 to 6

... and you would usually write it like this ... 3:6

Like fractions, ratios have a numerator and a denominator.

Denominator

Numerator **3:6**

Exercise 10

What is the ratio of dogs to cats? Answer:

Proportions

Multiplying or dividing each number in a ratio by the same number (except zero) will give an *equal ratio*, ie two ratios that mean the same thing. An equal ratio is also known as a proportion. It's easy to find an equal ratio/proportion – let's consider the ratios 3:6 and 1:2.

Multiply each number in the ratio (in this case 3 and 6) by the lower number (3 in our example). This converts the 3:6 ratio to 1:2.

$$\begin{aligned} 3 \div 3 &= 1 \\ \text{and} \\ 6 \div 3 &= 2 \end{aligned}$$

The calculation on the previous page shows that a ratio equal to 3:6 is 1:2. You can see this illustrated below as **one** equal group of cats to **two** equal groups of dogs – ie 1:2.



If you already have two ratios, and you need to find out whether or not they are equal, you can:

Divide the numerator by the denominator, for each ratio. If the answers are the same, the ratios are equal.

$$3 \div 6 = .5$$

and

$$1 \div 2 = .5$$

OR

Multiply the numerator of the first ratio by the denominator of the second.

Multiply the denominator of the first ratio by the numerator of the second.

If you get the same answer the ratios are equal.

$$3 \times 2 = 6$$

and

$$6 \times 1 = 6$$

Exercise 11

Complete the following table to show whether each set of ratios is equal or not.
(The first one has been completed for you.)

Determine whether or not these ratios are equal	Complete your calculations here	Are the ratios equal?
3:6 and 15:30	$3 \div 6 = .5$ and $15 \div 30 = .5$	Yes
6:12 and 16:24		
12:24 and 3:6		
6:12 and 3:6		

Exercise 12

- 1 On a boating lake there are 24 boats, and four of them are blue. What is the ratio of blue boats to all boats?

Answer:

- 2 Of the 24 boats at the lake, eight are white. What is the ratio of white boats to all boats?

Answer:

- 3 Of the 24 boats at the lake, the other twelve boats are unpainted aluminium. What is the ratio of unpainted aluminium boats to blue boats?

Answer:

