TeeJay

SQA National 4

Applications of Mathematics

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HODDER GIBSON
AN HACHETTE UK COMPANY

National 4 Applications of Mathematics Textbook

The book forms the basis of a one or two year course following the outcomes for **National 4 Applications of Mathematics** as outlined by Education Scotland and the SQA.

- The book is based around our very successful N4-1 and N4-2 books.
- The assumption is that pupils embarking on this course will have been successful at CfE Second Level and may have completed the **National 3 Applications of Mathematics** course.
- The book covers the three study areas: **Numeracy**, **Geometry/Measure** and **Finance/Statistics** in that order.
- Each study area ends with a consolidation **Assessment**.
- The book contains a short "**Chapter Zero**", which primarily revises all the relevant strands from CfE Second Level that have been covered in our CfE Books 2a and 2b.
- Each chapter has an "**Assessment**" exercise as a summary.
- There are no A and B exercises. The book covers the entire **National 4 Applications of Mathematics course** without the teacher having to pick and choose which questions to leave out and which exercises are important. They all are!
- Pupils who cope well with the contents of this **National 4 Applications of Mathematics** book should be able to be assessed at various stages throughout the course and be ready to sit a study area or course assessment or an examination.
- **Homework** is available as a photocopiable pack.
- There are two End-of-Course **Added Value Practice Assessments**
- Answers for the Exercise questions can be found at the back of this book. **Answers for the Assessments** can be found at **www.hoddergibson.co.uk/answers-teejay-maths-n4-apps**

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Note: Use of calculators throughout book - We have left this as discretionary, but certain exercises are specifically designated as "calculator free", particularly for those pupils being presented for the **Added Value** Assessment.

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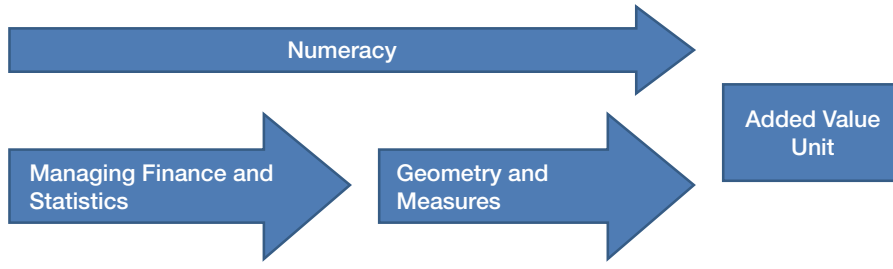
Sequencing and integration of study areas within the N4 Applications course

According to the official SQA website, sequencing and integration of the delivery and assessment of the study areas within the course is at the discretion of the centre. The examples which follow illustrate possible approaches which may be adopted. Please note that other combinations are also possible.

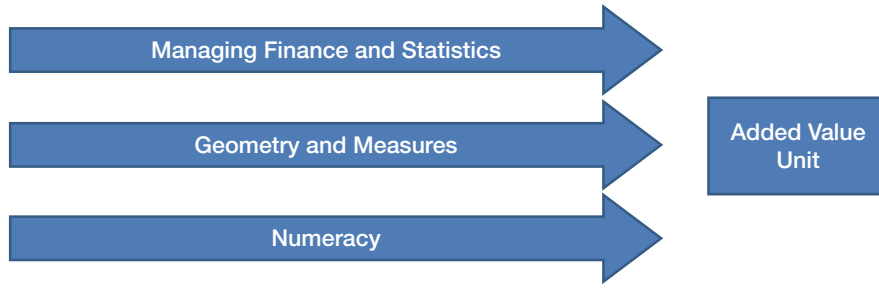
Example 1

This example shows the possibility of delivering Managing Finance and Statistics and Geometry and Measures sequentially, with Numeracy being delivered throughout. This sequence would allow more time for learning and teaching and provide the opportunity to reinforce and consolidate numerical skills through the course. The study areas on Managing Finance and Statistics and on Geometry and Measures can be delivered in any order. Completion of all three study areas would lead on to the assessment of Added Value which draws on the skills, knowledge and understanding from across the course.



Example 2

This example shows the possibility of delivering all three study areas concurrently: Managing, Finance and Statistics, Geometry and Measures, and Numeracy. This approach would be particularly useful if Applications of Mathematics is delivered using a range of topics or themes which cut across all three study areas. Completion of all three at the same time would lead to the Added Value Unit which draws on the skills, knowledge and understanding from across the course.



Example 3 (This is how TeeJay has developed, ordered and presented the course)

This example shows the possibility of delivering Numeracy, Managing Finance and Statistics, and Geometry and Measures sequentially. This example could be beneficial for learners needing to reinforce and consolidate their numerical skills at the start of the course. Managing Finance and Statistics and Geometry and Measures can be delivered in any order. Completion of all three would lead on to the Added Value Unit.

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Contents

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Time-Distance-Speed

12 & 24 hour Time

Remember :-

12 hour time —> **24** hour time

24 hour time —> **12** hour time

Example :- 7·15 am —> 0715 8·50 pm —> **2050**

Exercise 1

1. Change the following 12 hour clock times to **24 hour clock times** :-

a	1·30 am	**b**	4·45 am	**c**	6 am
d	7·30 pm	**e**	2·15 pm	**f**	3 pm
g	6·15 am	**h**	8·20 am	**i**	2·10 am
j	7·50 am	**k**	midday		
l	12·45 am	**m**	12·45 pm		
n	9·15 pm	**o**	3·25 am		
p	8·20 pm	**q**	11·55 pm		
r	9·55 am	**s**	10·20 pm		
t	11·34 am	**u**	8·47 pm.		

0830 —> 8·30 am **2040 —> 8·40 pm**

2. Change the following 24 hour clock times to **12 hour clock times** :-

a	0140	**b**	1110	**c**	0925
d	1430	**e**	1740	**f**	2315
g	0245	**h**	1915	**i**	1310
j	1903	**k**	1200		
l	0630	**m**	0525		
n	1520	**o**	2355		
p	1935	**q**	0020		
r	0758	**s**	1147		
t	2030	**u**	2155.		

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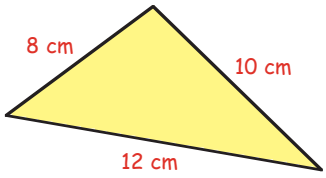
Perimeters

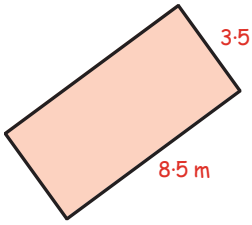
Geometry Assessment 2

1. Calculate the perimeter of each of these shapes :-

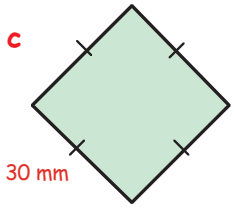
a



b



c



2. The perimeter of this rectangle is 62 cm.

Calculate the missing side of the rectangle.

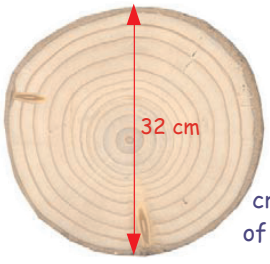
3. The diameter of the lid of this wooden barrel is 31 cm.

What is its radius ?

4. Calculate the circumference of each of these :-

a

b



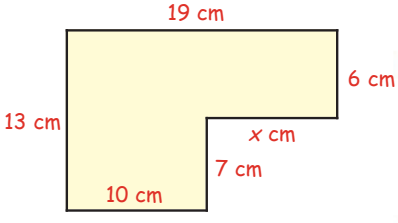
cross section
of a tree trunk

5. **a** Calculate the circumference of this bicycle wheel.

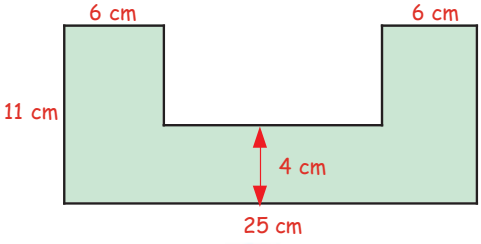
b How far will the bike travel if the wheel rotates 50 times ?
(*Answer in metres*).

6. **a** Calculate the length of the side marked ***x***.

b Now calculate the perimeter of the whole shape.



7.



Calculate the perimeter of this shape.

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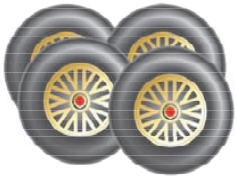
Study Area Assessment
Numeracy

Assessment Tasks

1. I bought a guitar in 2010 for £320.
I sold it in 2014 for 25% less than this.
How much did I sell the guitar for ? **(2)**

2.



Mr Jenkins owns a tyre store.
The tyres cost him £48·75 each.
How many tyres can he buy if he has £1000 ? **(2)**

3. Copy and complete the bus timetable shown.

Bus	Depart	Arrive	Journey Time
Ayr to Dundee	1800	.....	2 hrs 20 mins
Skye to Aberdeen	.....	1130	4 hrs 50 mins

(2)

4. Max drives from London to Glasgow, a distance of 420 miles.
If his average speed is 60 miles per hour, how long will his journey take if he makes no stops ? **(2)**

5.

A chemical freezer unit was switched on at noon.
The temperature in the unit was 8°C.
By midnight the unit measured –47°C.
By how many degrees had the temperature fallen ? **(1)**

6. **a** A factory makes a tropical juice mix and uses orange and pineapple juice in a ratio of 5 : 3.
If the factory has 850 litres of orange, how many litres of pineapple will it need ? **(2)**

b The factory has orders for 1500 litres of tropical juice mix.
Does the factory have enough juice mix to fulfil this order ?
Give a reason for your answer. **(2)**

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Added Value
Practice Assessment 1

20 minutes

Marks

1. At his local Chinese restaurant, Joseph ordered Chicken Noodle Soup at £3·50, Sweet and Sour Chicken at £7·70 and a portion of Egg Fried Rice.

When he paid his bill with a £10 and a £5 note he got £1·05 change.

How much was it for the Egg Fried Rice ?

(3)

2.

A model of a cruise ship is 8·5 centimetres long.

The model was made using a scale of *1 cm = 30 metres.*

What is the length of the real cruise ship ? **(3)**

3. Eve laid out ten glasses, each with the same amount of water in them.

She poured in the following quantities of diluting orange juice :-

50 ml,	43 ml,	55 ml,	46 ml,	40 ml,	57 ml,	54 ml,	48 ml,	60 ml,	56 ml.

She then threw out the one with least amount of orange for being too watery and also the one with the greatest amount for being too strong.

The eight quantities left were all acceptable.

a From these eight drinks, write down the minimum and the maximum amount of diluting orange juice preferred. **(1)**

b Write the desired amount of orange juice in tolerance form (.... ± ....) ml. **(2)**

4. Mr Preston is considering taking out a £10 000 loan with *Jules Bank* to buy a car.

With *Jules Bank*'s 2% per annum interest rate, he would owe £10 200 after 1 year.

The garage he is buying the car from is offering him the same car for £9800 if he takes on their interest rate of 5% per annum.

Which option should Mr Preston take ? *(Give a reason for your answer)* **(5)**

5. A survey was carried out looking into how long it took seven television companies to answer telephone calls regarding technical faults in their system.

The results, in minutes, are shown below.

13	10	18	8	15	9	11

a Calculate the mean number of minutes taken. **(3)**

b How many companies took longer than the mean time ? **(1)**

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