REAL-LIFE MATHS

Geometry and Measures

Workbook for National 4 Applications of Mathematics

Unit 2: Geometry and Measures



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Blewis LEARNING

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How to use this book

This book helps you use measurement and geometry in real life: planning time, scale drawings, navigation, packing, tolerance, slopes, area, volume and Pythagoras. Each topic follows the same pattern, so you always know what comes next.

EACH TOPIC HAS

Opener	the story for the topic, what you will learn and the key words
Skill pages	a short explanation, a method box and a worked example
Practice pages	questions for you to try, with space for your working
Real-life task	a bigger problem that uses all the skills in the topic
Check-up	a few questions to show what you can do, and a checklist

LOOK OUT FOR

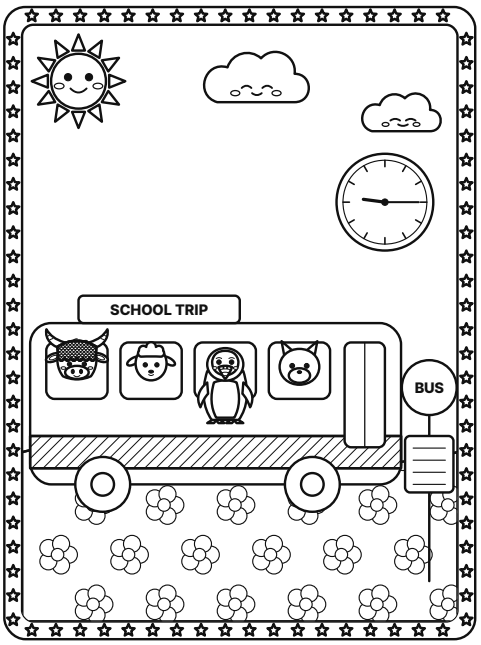
Method	the steps to follow
Worked example	a question that has been answered for you, step by step
Top tip / Watch out	helpful hints and common mistakes
Talk about it	questions to discuss with a partner or your teacher

SHOW YOUR WORKING
Write down your working in the boxes, not just the answer. It helps you check your answer, and your teacher can see how you got there.

CALCULATORS
Try to work things out in your head or on paper first. You can use a calculator when the page says so, or when your teacher says it is OK.

ANSWERS
The answers are at the back of the book. Use them to check your work after you have tried the questions yourself.

Time management



Being on time means planning. In this topic you will work out time intervals, plan tasks back from a deadline and use speed, distance and time.

Theme: the Glen Arrin ceilidh. Glen Arrin Community Hall is holding a ceilidh on Saturday night. Isla and Owen are on the team that must get the hall ready, collect the band and feed 80 guests. Everything has to happen on time.

IN THIS TOPIC YOU WILL LEARN TO

Skill 1	find time intervals using 12-hour and 24-hour times
Skill 2	plan a set of tasks back from a finish time
Skill 3	use speed, distance and time to plan a journey

KEY WORDS

Time interval	how long it is from one time to another
24-hour clock	times from 00:00 to 23:59, with no am or pm
Deadline	the time a job must be finished by
Speed	how far something travels in one unit of time, such as miles per hour (mph)
Average speed	total distance ÷ total time
Schedule	a plan showing when each task starts and ends

❶ Time intervals

Timetables often use the **24-hour clock**. To find how long something takes, count on from the start time to the finish time. A time line keeps the steps clear.

METHOD

Step 1	Change both times to the 24-hour clock if they are not already.
Step 2	Count on to the next whole hour.
Step 3	Count on whole hours, then the minutes left.
Step 4	Add up the parts. Remember 60 minutes = 1 hour.

WORKED EXAMPLE

The band's ferry leaves at **10:40** and arrives at **1:15 pm**. How long is the crossing?

24-hour	1:15 pm = 13:15
Count on	10:40 → 11:00 is 20 min; 11:00 → 13:00 is 2 h; 13:00 → 13:15 is 15 min
Add	2 h + 20 min + 15 min = **2 hours 35 minutes**

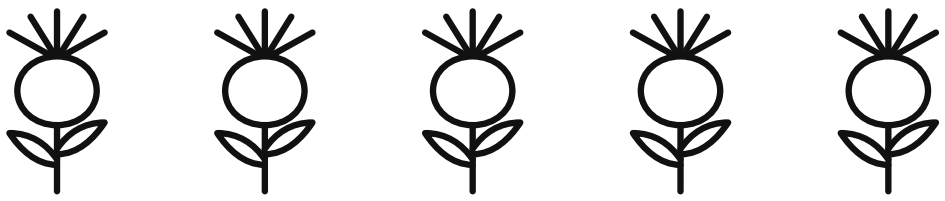
WATCH OUT

Do not subtract times like ordinary numbers. 13:15 − 10:40 is not 2 h 75 min. There are 60 minutes in an hour, not 100.

TOP TIP

To change a pm time to the 24-hour clock, add 12 to the hours: 7:30 pm = 19:30. Midnight is 00:00.

DOODLE CORNER



Practice: time intervals

1 Write each time in the 24-hour clock.

a 9:05 am	b 4:50 pm	c 11:20 pm	d 12:15 am

2 How long is each journey?

Journey	Leaves	Arrives	Time taken
Bus to Fort Arrin	08:45	10:10	
Train to Glasgow	11:52	14:27	
Overnight coach	22:30	06:05	

3 The ceilidh runs from 7:30 pm until 11:45 pm. The hall charges £18 an hour, or part of an hour.

a How long does the ceilidh last?

Answer: .....

b How much does the hall cost? Explain your answer.

WORKING

Answer: .....

4 Owen's bus leaves at 17:48. It takes 1 hour 25 minutes. The ceilidh starts at 19:30. Will he arrive before it starts? Explain.

WORKING

Answer: .....

DOODLE CORNER



❷ Planning back from a deadline

When a job must be finished by a set time, start at the **deadline** and work backwards. Take off each task's time in turn to find when you must start.

METHOD

Step 1	Write the deadline.
Step 2	Take away the time for the last task to find when it must start.
Step 3	Keep going backwards, task by task.
Step 4	The last time you find is the latest start time. Check by working forwards.

WORKED EXAMPLE

Isla must have everything done by the time the doors open. The tasks are done one after another.

Task	Time needed
Set out tables and chairs	45 min
Decorate the hall	1 h 10 min
Band sound check	40 min
Doors open	19:00

Sound check	19:00 − 40 min = 18:20
Decorate	18:20 − 1 h 10 min = 17:10
Tables	17:10 − 45 min = 16:25
Answer	**The team must start by 16:25 (4:25 pm).**

TALK ABOUT IT

Would it be sensible to start at exactly 16:25? What could go wrong? Many planners add 15 minutes spare.

Practice: planning back from a deadline

1 Owen is cooking stovies for the ceilidh. They must be ready at 20:30.

Task (in this order)	Time needed
Peel and chop	35 min
Brown the meat and onions	20 min
Simmer	1 h 30 min
Rest	10 min

a What is the latest time Owen can start?

WORKING

Answer:

b Owen starts at 5:45 pm. Will the stovies be ready on time? Explain.

Answer:

2 The ceilidh band must be at the hall by 18:15. The drive takes 55 minutes and they need 20 minutes to load the van. What is the latest time they can start loading?

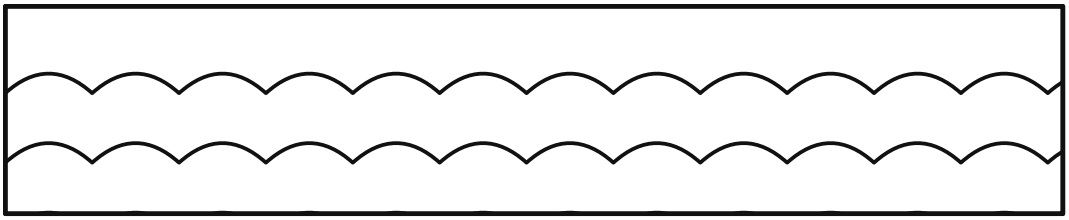
WORKING

Answer:

3 Isla needs 8 hours of sleep and must wake at 07:20 for a fun run. What time should she go to sleep?

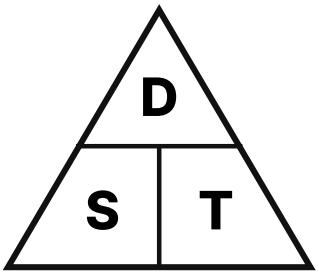
Answer:

DOODLE CORNER



3 Speed, distance and time

Speed tells you how far you travel in a unit of time. Use the triangle to remember the three formulas.



Distance	D = S × T
Speed	S = D ÷ T
Time	T = D ÷ S

WORKED EXAMPLE

The band drives 66 miles to the hall at an average speed of 44 mph. How long will it take?

Formula	T = D ÷ S = 66 ÷ 44 = 1.5 hours
Change	0.5 hours = 0.5 × 60 = 30 minutes
Answer	**1 hour 30 minutes**

WATCH OUT

1.5 hours is 1 hour 30 minutes, not 1 hour 50 minutes. To change a decimal of an hour to minutes, multiply by 60.

DOODLE CORNER

FREE SAMPLE

Geometry and Measures (N4 Apps of Maths)

This sample shows a few pages. The full printed workbook is available from Amazon.

blewislearning.co.uk

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