Introduction

Helping you prepare for Edexcel GCSE (9-1) Mathematics – Foundation, these workbooks are a good way to refresh your learning on Number (and a little Algebra), Statistics and Geometry (including Measures).

Work your way through the books unit by unit:

- The clear learning objectives help you focus
- The key points give you reminders
- The worked examples guide you through to the solution
- All the carefully stepped practice develops your confidence
- Stretch yourself a bit with extend questions
- The unit summaries help you recap and revise
- Take the unit tests to check your fluency and build your confidence
- Take the Practice Test at the end of the book to check your progress.

And there’s a useful self-assessment chart provided for you to fill in as you go!

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**Contents**

Samples from *Number and Statistics* and *Geometry Workbooks*

- Multiply and divide by 10, 100 and 1000 3
- Rounding decimals 4
- Convert between units of time 7
- Use fractions to compare quantities 8
- Find percentages of quantities 9
- Read and interpret data presented in tables 10
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1.3 Multiply and divide by 10, 100 and 1000

By the end of this section you will know how to:

• Multiply integers by 10, 100 and 1000
• Divide multiples of 10, 100 and 1000 by 10, 100 and 1000

Key points

• Multiplying a number by 10, 100 or 1000 means that each digit moves in place value to the left.
• Dividing a number by 10, 100 or 1000 means that each digit moves in place value to the right.

1 Work out the answers to these multiplications.

a 34 × 10 = 340
b 123 × 10 = ............
c 560 × 100 = ............
d 37 × 1000 = ............

2 Work out the answers to these multiplications.

a 57 × 10 = ............
b 583 × 10 = ............
c 120 × 10 = ............
d 6 × 100 = ............
e 72 × 100 = ............
f 376 × 100 = ............
g 60 × 1000 = ............
h 752 × 1000 = ............
i 360 × 1000 = ............

3 Work out the answers to these divisions.

a 120 ÷ 10 = 12
b 2650 ÷ 10 = ............
c 4800 ÷ 100 = ............
d 7000 ÷ 1000 = ............

4 Work out the answers to these divisions.

a 50 ÷ 10 = ............
b 290 ÷ 10 = ............
c 5000 ÷ 10 = ............
d 400 ÷ 100 = ............
e 6000 ÷ 1000 = ............
f 2500 ÷ 100 = ............
g 8300 ÷ 100 = ............
h 3000 ÷ 1000 = ............
i 12 000 ÷ 1000 = ............

5 Use the numbers in the cloud to give the answers to the following calculations.

a 45 × 10 = ............
b 450 ÷ 10 = ............
c 45 × 100 = ............
d 4500 ÷ 10 = ............
e 45000 ÷ 1000 = ............
f 45 ÷ 1000 = ............
g 45 000 ÷ 1000 = ............
h 45 000 ÷ 100 = ............

6 a Write a matching multiplication and division. 720 = ............ × ............ = ............ ÷ ............
b Fill in the missing number. 63 × ............ = 6300
c Fill in the missing number. ............ ÷ 1000 = 32

45 450 45 000

Hint

10 times table facts and related divisions.

274 × 10
= 200 × 10 + 70 × 10 + 4 × 10
= 2000 + 700 + 40
= 2740

270 ÷ 10
= 200 ÷ 10 + 70 ÷ 10
= 20 ÷ 7
= 27

Extend

By the end of this section you will know how to:

• Multiply integers by 10, 100 and 1000
• Divide multiples of 10, 100 and 1000 by 10, 100 and 1000

Multiply and divide by 10, 100 and 1000

Multiplying a number by 10, 100 or 1000 means that each digit moves in place value to the left.
Dividing a number by 10, 100 or 1000 means that each digit moves in place value to the right.
6 Use a calculator to check what happens when you divide whole numbers and decimals by 10 or 100.

a 36 ÷ 10 = 

b 72 ÷ 10 = 

c 15.4 ÷ 10 = 

d 28.3 ÷ 10 = 

e 5.6 ÷ 10 = 

f 4.8 ÷ 10 = 

g 27 ÷ 100 = 

h 93 ÷ 100 = 

i 123 ÷ 100 = 

j 456 ÷ 100 = 

k 6789 ÷ 100 = 

l 5432 ÷ 100 = 

7 Look at the answers in question 6 to work out these calculations without a calculator.

a 49 ÷ 10 = 

b 84 ÷ 10 = 

c 17.6 ÷ 10 = 

d 37.4 ÷ 10 = 

e 4.8 ÷ 10 = 

f 8.9 ÷ 10 = 

g 36 ÷ 100 = 

h 72 ÷ 100 = 

i 468 ÷ 100 = 

j 752 ÷ 100 = 

k 3764 ÷ 100 = 

l 4821 ÷ 100 = 

8 Use a calculator to find which answer belongs to which calculation.

a 17.08 × 6 = 

b 567.25 ÷ 5 = 

c 443.1 ÷ 4.2 = 

d 9.23 × 12.06 = 

9 a Use the fact that 24 × 8 = 192 to work out 2.4 × 8 = 

b Use the fact that 192 ÷ 8 = 24 to work out 19.2 ÷ 8 = 

c Work out the answers.

1200 ÷ 1000 = 1.234 × 1000 = 3.2 × 6 = 

Rounding decimals

By the end of this section you will know how to:

* Round decimals to the nearest whole number
* Round decimals to one decimal place

Key points

* The same rules of rounding apply to decimals and whole numbers.
* Round to the nearest whole number: round 0.1, 0.2, 0.3 and 0.4 down; round 0.5, 0.6, 0.7, 0.8 and 0.9 up.
* Round to the one decimal place: round down if the hundredths digit is 1, 2, 3 or 4; round up if it is 5, 6, 7, 8 or 9.
1. Use the number line to help you to round these numbers to the nearest whole number.

<table>
<thead>
<tr>
<th></th>
<th>round down</th>
<th></th>
<th></th>
<th>round up</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

- **a** 5.2 rounds to ...........
- **b** 5.8 rounds to ...........
- **c** 2.7 rounds to ...........
- **d** 3.4 rounds to ...........
- **e** 1.3 rounds to ...........
- **f** 4.5 rounds to ...........

2. **a** Join each decimal to the nearest one decimal place. Use the number line to help.

|   |   |   |   | 5 | 5.05 | 5.1 | 5.15 | 5.2 | 5.25 | 5.3 | 5.35 | 5.4 | 5.45 | 5.5 | 5.55 | 5.6 | 5.65 | 5.7 | 5.75 | 5.8 | 5.85 | 5.9 | 5.95 | 6 |
|---|---|---|---|---|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|
| 5.43 | 5.1 | 5.06 | 5.2 | 5.3 | 5.17 | 5.4 | 5.55 | 5.5 | 5.6 | 5.73 | 5.7 | 5.92 | 5.8 | 5.64 | 5.9 | 6 |

- **b** Write each number correct to the nearest whole number.
  - 45.62 ...........
  - 45.263 ...........
  - 45.3456 ...........

- **c** Write each number correct to one decimal place.
  - 45.62 ...........
  - 45.263 ...........
  - 45.3456 ...........

3. **a** Write two decimal numbers that round up to 8. ...........

- **b** Write two decimal numbers that round down to 8. ...........

- **c** Write two decimal numbers that round up to 3.4 ...........

- **d** Write two decimal numbers that round down to 3.4 ...........

- **e** Write these decimals correct to one decimal place. 2.916 ...........

- **f** A number rounds up to 6, but down to 5.5. What number could it be? ...........

**Don’t forget!**

- When you multiply a number by 10, each digit moves one place to the ...........

- When you divide a number by 100, each digit moves ...........

- What is wrong with this? 3 4 . 5 ...........

  + 2.5 ...........

  5 9 . 5
Unit test

1. What is the value of the 6 in each of these numbers?
   a. 34.67  
   b. 36.47  
   c. 34.76  

2. Write these numbers in order of size. Start with the smallest number.
   34.7  34.67  36.47  34.76  36.04

3. Round these numbers to the nearest whole number.
   a. 24.67  
   b. 16.48  
   c. 29.706  

4. Round these numbers correct to one decimal place.
   a. 15.33  
   b. 36.47  
   c. 41.062  

5. a. Work out 56.4 + 31.78  
     b. Work out 65.4 − 31.78  

6. Work out
   a. 0.5 × 7 =  
   b. 5 × 0.7 =  
   c. 3.5 ÷ 7 =  
   d. 2.4 ÷ 2 =  
   e. 4.2 ÷ 7 =  
   f. 4.6 × 4 =  

7. Use your calculator to work out
   a. 17.09 × 4.2  
   b. 67.48 ÷ 12.05  

8. a. Work out
   24.05 × 10 =  
   2460 ÷ 10 =  
   23 900 ÷ 100 =  
   2.45 × 100 =  
   b. Write your answers to part a in order. Start with the smallest number.
Convert between units of time

By the end of this section you will know how to:
* convert between different units of time

Key points

* 1 day is 24 hours; 1 week is 7 days; 1 year is 12 months.
* 1 hour is 60 minutes; 1 minute is 60 seconds.
* 1 year is 365 days, 52 weeks or 12 months.

1 Use the numbers in the box to complete the statements about time.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>12</th>
<th>30</th>
<th>52</th>
<th>60</th>
<th>240</th>
<th>366</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
<td>e</td>
<td>f</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| \( \ldots \) months = 1 year | \( \ldots \) hour = \( \ldots \) minutes | \( \ldots \) seconds = 4 minutes | \( \ldots \) minutes = half an hour | \( \ldots \) weeks = 1 year | \( \ldots \) days in a leap year |

2 Convert these units of time.

a 5 hours into minutes

\[ 5 \times 60 = 300 \text{ minutes} \]

b 36 months into years

\[ 36 \div 12 = 3 \text{ years} \]

c 60 minutes into seconds

\[ 60 \times \ldots = \ldots \text{ seconds} \]

d 416 weeks into years

\[ \ldots \div \ldots = \ldots \text{ years} \]

e 315 days into weeks

\[ \ldots \div \ldots = \ldots \text{ weeks} \]

f 72 hours into days

\[ \ldots \div \ldots = \ldots \text{ days} \]

g 24 hours into \text{ seconds}

\[ 24 \times \ldots \times \ldots = \ldots \text{ seconds} \]

3 Use multiplication and division to convert these times.

a 4 days = \( \ldots \) hours

b 56 days = \( \ldots \) weeks

c 10 minutes = \( \ldots \) seconds

\[ \ldots \text{ months} = 6 \text{ years} \]

d \( \ldots \text{ months} = 6 \text{ years} \)

e 420 minutes = \( \ldots \) hours

\[ \ldots \text{ years} = 48 \text{ months} \]

f \( \ldots \text{ years} = 48 \text{ months} \)

4 Work out the answers.

a Eryk is at college 5 days a week for 32 weeks. How many days is that?

\[ \ldots \text{ days} \]

b The TV programme lasts 2 \( \frac{1}{4} \) hours.

How many minutes are there in 2 \( \frac{1}{4} \) hours?

\[ \ldots \text{ minutes} \]

c Susie cycles at a speed of 12 miles per hour. She cycles for 3 hours.

How many miles does she cycle?

\[ \ldots \text{ miles} \]

d Joe travelled 100 miles in 2 hours. How many miles per hour is that?

\[ \ldots \text{ miles per hour} \]
Use fractions to compare quantities

By the end of this section you will know how to:

* Find a fraction of a quantity
* Solve fraction problems

**Key points**

* You can find a fraction of a quantity by using multiplication of fractions.
* You can use fractions to solve problems.

1. Work out
   a. \(\frac{3}{4}\) of 60
      
      \[60 \div 4 = \ldots\]
      \[\ldots \times 3 = \ldots\]

   b. \(\frac{5}{8}\) of 72
      
      \[72 \div \ldots = \ldots\]
      \[\ldots \times \ldots = \ldots\]

2. Which is larger, \(\frac{2}{3}\) of 45 or \(\frac{5}{6}\) of 42? You must show your working.

   \[45 \div \ldots = \ldots \quad \ldots \times \ldots = \ldots\]
   \[42 \div \ldots = \ldots \quad \ldots \times \ldots = \ldots\]

   So \(\ldots\) is larger than \(\ldots\).

3. Work out \(\frac{3}{7}\) of £56.

   £ \(\ldots\)

4. Work out \(\frac{4}{5}\) of £85.

   £ \(\ldots\)

5. Work out \(\frac{7}{12}\) of £144.

   £ \(\ldots\)

6. A clothes shop gives a student discount of \(\frac{1}{8}\) off the price.
   A student buys a dress with a price of £128.
   How much does she have to pay?

   £ \(\ldots\)
Find percentages of quantities

By the end of this section you will know how to:

* Find a percentage of a quantity

### Key points

* There are a number of different ways to work out a percentage of an amount:
  - when using a calculator, change the percentage to a fraction or decimal then multiply by the amount
  - or, when using a calculator, you can multiply the amount by the percentage then press the percentage key on your calculator
  - when not using a calculator, first work out 10% and build up the percentage.

### Example

1. Find 70% of 120.
   - a) using a calculator
     \[ \frac{70}{100} \times 120 = \ldots \]
   - b) using the % key
     \[ 120 \times 70 \% \]
   - c) without a calculator
     \[ 10\% \text{ of } 120 = \ldots \text{ so } 70\% = 7 \times \ldots = \ldots \]

### Practice

2. Work out
   - a) 45% of 400
   - b) 55% of 60

3. Work out
   - a) 15% of £80
   - b) 35% of £120

4. Which is larger
   - a) \[ \frac{2}{3} \text{ of } 60 \text{ or } 70\% \text{ of } 55 \]
   - b) \[ \frac{2}{5} \text{ of } 50 \text{ or } 45\% \text{ of } 60? \]
Read and interpret data presented in tables

By the end of this section you will know how to:

* Find and understand information given in tables

Key points

* Use the labels on the rows and columns to find information.
* You may need to add values in a row or column to find a total.
* You may need to subtract one value from another in the table to find a difference.

1 The table shows the number of students in each year group in a secondary school.

<table>
<thead>
<tr>
<th>Year group</th>
<th>Number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>124</td>
</tr>
<tr>
<td>10</td>
<td>116</td>
</tr>
<tr>
<td>9</td>
<td>137</td>
</tr>
<tr>
<td>8</td>
<td>128</td>
</tr>
<tr>
<td>7</td>
<td>112</td>
</tr>
</tbody>
</table>

a How many students are in Year 11? ...........................................

b Which is the largest year group? ..............................................

c The senior students are in Years 10 and 11. How many senior students are there?

2 Here is part of a train timetable. It shows the time that a train leaves each station.

<table>
<thead>
<tr>
<th>Station</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bempton</td>
<td>1253</td>
</tr>
<tr>
<td>Hunmanby</td>
<td>1303</td>
</tr>
<tr>
<td>Filey</td>
<td>1308</td>
</tr>
<tr>
<td>Seamer</td>
<td>1320</td>
</tr>
<tr>
<td>Scarborough</td>
<td>1325</td>
</tr>
</tbody>
</table>

a What time does the train leave Hunmanby?

b The train is in Seamer station for 3 minutes. What time did the train arrive at Seamer?

Practice

Need more practice   Almost there   Got it!
5 The table shows the midday temperatures in five towns.

<table>
<thead>
<tr>
<th>Location</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiff</td>
<td>−3°C</td>
</tr>
<tr>
<td>Lancaster</td>
<td>−1°C</td>
</tr>
<tr>
<td>Poole</td>
<td>2°C</td>
</tr>
<tr>
<td>Stone</td>
<td>1°C</td>
</tr>
<tr>
<td>Whitby</td>
<td>−2°C</td>
</tr>
</tbody>
</table>

a What is the temperature in Whitby? ..............................................
b Which is the coldest location? .....................................................
c How much warmer is Poole than Whitby? .......................................

6 Here is part of a train timetable. It shows the time that the train leaves each station.

<table>
<thead>
<tr>
<th>Station</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thirsk</td>
<td>0610</td>
</tr>
<tr>
<td>Northallerton</td>
<td>0618</td>
</tr>
<tr>
<td>Darlington</td>
<td>0636</td>
</tr>
<tr>
<td>Thornaby</td>
<td>0653</td>
</tr>
<tr>
<td>Middlesbrough</td>
<td>0703</td>
</tr>
</tbody>
</table>

a What time does the train leave Thornaby? .....................................
b The train stops at Middlesbrough for 5 minutes. How long does it take to get from Darlington to Middlesbrough? ................................................................. minutes

7 The table shows the numbers of cars sold by five sales people over a four-week period.

<table>
<thead>
<tr>
<th></th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graham</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Jinty</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Matt</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Sally</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Mike</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

a How many cars did Mike sell in Week 2? ........................................
b How many cars were sold altogether in Week 1? ................................
c Who sold the most cars? ..................................................................
d How many more cars were sold in Week 4 than in Week 3? ..................
8 The table shows the distances in miles between some English cities.

<table>
<thead>
<tr>
<th></th>
<th>Dover</th>
<th>Exeter</th>
<th>Hull</th>
<th>Manchester</th>
<th>Sheffield</th>
<th>Worcester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheffield</td>
<td>242</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manchester</td>
<td>249</td>
<td>284</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hull</td>
<td>275</td>
<td>234</td>
<td>95</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exeter</td>
<td>234</td>
<td>232</td>
<td>64</td>
<td>39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dover</td>
<td>190</td>
<td>133</td>
<td>159</td>
<td>112</td>
<td>102</td>
<td></td>
</tr>
</tbody>
</table>

a How far is it from Hull to Sheffield? ........................................ miles

b Which city is less than 200 miles from Dover? ................................ miles

c Which city is closest to Hull? ....................................................

d Kari drives from Dover to Sheffield and then from Sheffield to Hull. How far does she drive altogether?

........................................ miles

e Kari returns to Dover without going to Sheffield. How much shorter is this route?

........................................ miles

9 Records of rainfall in the UK go back to 1910. The table shows the amounts of rainfall for the wettest five years in that time.

<table>
<thead>
<tr>
<th>Year</th>
<th>Rainfall (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1954</td>
<td>1309</td>
</tr>
<tr>
<td>2000</td>
<td>1337</td>
</tr>
<tr>
<td>2002</td>
<td>1284</td>
</tr>
<tr>
<td>2008</td>
<td>1295</td>
</tr>
<tr>
<td>2012</td>
<td>1331</td>
</tr>
</tbody>
</table>

a How many of the five wettest years have occurred from 2000 onwards? ........................................

b Which year was the wettest? ....................................................

c How many years are there between the two most recent entries in the table?

........................................

d How many years are there between the two oldest entries in the table?

........................................
By the end of this section you will know how to:

* Draw triangles accurately when at least one angle is given.
* Draw triangles accurately when given all three sides.

**Key points**

* A metric ruler shows centimetres and millimetres; it is used to measure lines accurately.
* A protractor is used to measure angles accurately.
* A pair of compasses is used to locate the point of intersection of two sides of a triangle.

1. Make an accurate drawing of this triangle.

   ![Diagram 1](image1)

   Measure the length of $BC$: $BC = \ldots \text{ cm}$

2. Make an accurate drawing of this triangle.

   ![Diagram 2](image2)

   Measure the length of $EF$: $EF = \ldots \text{ cm}$
3 Make an accurate drawing of this triangle.

Measure the length of $PR$: $PR = \ldots$ cm

4 Make an accurate drawing of this triangle.

Measure the lengths of $JL$ and $KL$: $JL = \ldots$ cm
$KL = \ldots$ cm
5. Make an accurate drawing of this triangle.

Measure the lengths of MP and NP:
\[ MP = \text{cm} \]
\[ NP = \text{cm} \]

6. Make an accurate drawing of this diagram.

Measure the lengths of VY, XZ and XY:
\[ VY = \text{cm} \]
\[ XZ = \text{cm} \]
\[ XY = \text{cm} \]
Which students are the Access to Foundation Workbooks designed to support?
For students who need a ‘refresher course’ to increase their fluency and confidence before starting Edexcel GCSE (9-1) Mathematics Foundation course.

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