Get back on track

The COVID-19 pandemic has been disruptive for students of all ages around the world. And if you’re preparing for your GCSEs then it’s especially important that you catch up on any work you’ve missed. This pack is designed to help you revise and practise any topics you might need a reminder on, and stay on track for success in your Pearson Edexcel Mathematics GCSE course.

Time for a check-up

Take the Knowledge check diagnostic self-test to help you identify which topics and skills you need to recap. The questions in this test focus on key skills and core knowledge that you will need to know to succeed in the rest of your GCSE course, and in your exams.

You can mark your own work using the answers on the back cover (page 20) of this booklet. If you struggle with any of the questions, just add the Revision Guide page numbers for that question to your custom catch-up plan on page 15. Then you can revise and practise that topic and build your confidence.

Make a plan

Create your own custom Catch-up plan by entering the page numbers you need to revise in the table on page 15. You can use the tick boxes to track your progress, and there is space on pages 16 and 17 to add any extra notes from your teacher or tutor.

Stress-free studying

Here are a few top tips from our experts to stay healthy and sane when things get busy!

• Set yourself simple targets, like reviewing a couple of pages of the Revision Guide in a 20-minute study session.

• Phone a friend! If you’re struggling with a topic, ask one of your friends if they’ve figured it out and can explain it to you.

• Find a quiet space at home or at school – use headphones if it helps you to concentrate.

• Put your phone on silent, and try not to get distracted by TV or the internet.

• Drink plenty of water, get plenty of sleep, take breaks and stay active!
Once you have identified your target topics and created your catch-up plan, it’s time to break open the books and get revising. The Revision Guide and Revision Workbook in your pack have matching page numbers to help you find your way around quickly and easily.

Find your catch-up topics

If you know which units or topics you want to revise, you can use the Matching chart to find the corresponding Revision Guide and Workbook pages. Your teacher or tutor might be able to tell you which units or topics you missed, or you might recognise them from the work you did at home during lockdown.

Tick the units or topics you want to revise, then add those page numbers to your catch-up plan on page 15.
Knowledge check

You can use the diagnostic self-test on the next 11 pages to help you create your own customised catch-up plan. Each question checks a different key skill or piece of core knowledge from your GCSE course. If you feel that you need more help with that topic or skill, add the page numbers shown in the arrows to your catch-up plan.

A bit at a time

There are 70 questions in this knowledge check. Have a go at them in chunks. When you have done a batch of 10 or 20 questions, check your answers on the back cover (page 20) of this booklet. Then take a break or come back and try some more in another study session!

### Number

**1 Factors and primes**

Express 600 as a product of its prime factors.

- A $2^2 \times 5^2 \times 6$
- B $2^3 \times 3^2 \times 5^3$
- C $2^3 \times 3 \times 5^2$
- D $2 \times 3 \times 10^2$

- [ ] Revise page 1

**2 Indices**

Write $\frac{7^{10}}{7} \times 7^3$ as a single power of 7.

- A $7^{29}$
- B $7^{12}$
- C $7^{23}$
- D $7^{-13}$

- [ ] Revise pages 2, 3

**3 Rounding**

Round 0.0473508 to 3 significant figures.

- A 0.047
- B 0.0473
- C 0.0474
- D 0.05

- [ ] Revise page 4

**4 Mixed numbers**

Work out $1 \frac{7}{8} \times 3 \frac{2}{5}$

- A $6 \frac{3}{8}$
- B $4 \frac{9}{13}$
- C $3 \frac{7}{20}$
- D $5 \frac{1}{8}$

- [ ] Revise page 5

**5 Standard form**

Write 736 000 in standard form.

- A $7.36 \times 10^5$
- B $736 \times 10^3$
- C $7.36 \times 10^3$
- D $7.36 \times 10^{-6}$

- [ ] Revise page 8

**6 Recurring decimals**

Write the recurring decimal 0.05 as a fraction. Do not use a calculator.

- A $\frac{5}{9}$
- B $\frac{1}{18}$
- C $\frac{1}{20}$
- D $\frac{5}{99}$

- [ ] Revise pages 6, 9
7 Upper and lower bounds

The length of a carrot is 20 cm, rounded to the nearest cm.
What is the upper bound for this length?

A 20.5 cm
B 20.49 cm
C 25 cm
D 19.5 cm

8 Surds

Write \( \frac{3}{1-\sqrt{2}} \) in the form \( a + b\sqrt{2} \),
where \( a \) and \( b \) are integers.
Do not use a calculator.

A \( 3 + 3\sqrt{2} \)
B \( 3 - 3\sqrt{2} \)
C \( 3 - \frac{1}{3}\sqrt{2} \)
D \( -3 - 3\sqrt{2} \)

9 Counting

This combination lock uses two letters from A to Z and two digits from 0 to 9.

C X 0 5

Work out the total number of possible combinations.

A 67 600
B 72
C 6760
D 260

10 Algebraic indices

Simplify \((x^2y)^3\)

A \( x^2y^3 \)
B \( x^6y^3 \)
C \( xy^6 \)
D \( x^3y^3 \)

11 Expanding brackets

Expand and simplify \(3(4a + b) - 2(a - 2b)\)

A \( 10a - b \)
B \( 10a + 7b \)
C \( 9a + 7b \)
D \( 5a + b \)

12 Double bracket

Expand and simplify \((2x + 3)^2\)

A \( 4x^2 + 9 \)
B \( 2x^2 + 6x + 9 \)
C \( 4x^2 + 12x + 9 \)
D \( 4x^2 + 6x + 9 \)

13 Factorising

Factorise \(x^2 - 4x - 12\)

A \( 4(x - 3) \)
B \( (x - 4)(x + 3) \)
C \( (x - 6)(x + 2) \)
D \( (x - 4)^2 \)
Knowledge check

14 Linear equations

Solve $6x + 2 = 8x - 1$

A $x = 0.75$

B $x = 2$

C $x = -1$

D $x = 1.5$

Revise page 19

15 Equations with fractions

Solve $\frac{x}{5} + \frac{x-1}{3} = 1$

A $x = \frac{1}{3}$

B $x = \frac{5}{2}$

C $x = -3$ or $x = -5$

D $x = 8$

Revise page 20

16 Formulae

$P = 5Q^2 - 2QR$

Find the value of $P$ when $Q = 4$ and $R = -3$

A 76

B 104

C 112

D 56

Revise page 21

17 Sequences

Find an expression for the $n$th term of this sequence.

$8, 11, 14, 17, 20$

A $3n + 5$

B $5n + 3$

C $8n + 3$

D $20 - 3n$

Revise pages 22, 24

18 Straight line graphs

Find the equation of this straight line.

A $y = 2x - 1$

B $y = \frac{1}{2}x - 1$

C $y = -x + 2$

D $y = 2x + 1$

Revise pages 25, 26

19 Parallel and perpendicular lines

The line $L$ has equation $2x + y = 5$

Which one of the following lines is perpendicular to $L$?

A $y = 2x - 5$

B $y = 5 - 2x$

C $y = \frac{1}{2}x + 10$

D $y = -\frac{1}{2}x$

Revise page 27

20 Harder graphs

Match this graph to the correct equation.

A $y = 3 - x^2$

B $y = x^2 - 3$

C $y = x^2 + 3$

D $y = x^3$

Revise pages 28, 29, 43
The distance–time graph shows a hike.

During which section was the hiker stationary?

A  B  C  D

Solve the equation

\[ x^2 - 10x + 16 = 0 \]

A  B  C  D

Write \( x^2 + 6x - 1 \) in the form \((x + p)^2 + q\) where \(p\) and \(q\) are integers.

A  B  C  D

Solve the simultaneous equations

\[
\begin{align*}
5x + 6y &= 5 \\
x - 2y &= 9
\end{align*}
\]

A  B  C  D

What is the equation of this circle?

A  B  C  D

Solve the inequality \( 3x + 1 < x - 5 \)

A  B  C  D

How many solutions does the equation \( 4 \sin x + 3 = 2 \) have in the range \(0° \) to \(180°\)?

A  B  C  D

The graph with equation \( y = f(x) \) is translated by vector \( \left( \begin{array}{c} -1 \\ -5 \end{array} \right) \)

Which of the following is the equation of the translated graph?

A  B  C  D
Knowledge check

29 Regions on graphs
Write down the set of inequalities that defines the shaded region $R$.

- $A \ x \leqslant 5, y \geqslant 2, x > y$
- $B \ y \geqslant 2, x \leqslant 5, x < y$
- $C \ y > 2, x < 5, x \leqslant y$
- $D \ y \geqslant 5, x \leqslant 2, x < y$

30 Iteration
Use the iterative formula $x_{n+1} = \sqrt{x_n^2 - 1}$ with $x_0 = 3$ to work out $x_2$.
Round your answer to 3 decimal places.

- $A \ 2.65$
- $B \ 2.83$
- $C \ 2.45$
- $D \ 1.41$

31 Rearranging formulae
$M = 6R - 20$
Rearrange the formula to make $R$ the subject.

- $A \ R = \frac{M + 20}{6}$
- $B \ R = 6M + 20$
- $C \ R = \frac{M}{6} + 20$
- $D \ R = \frac{1}{6}(M - 20)$

32 Fractions and quadratic equations
Solve the equation $\frac{2}{1 + x} + \frac{4}{x} = 5$

- $A \ x = 6$
- $B \ x = -0.8$ or $x = 1$
- $C \ x = -4$ or $x = 1$
- $D \ x = 0.8$ or $x = -1$

33 Functions
$f(x) = (2x - 3)^2$
Find $f(-1)$

- $A \ -25$
- $B \ 1$
- $C \ -11$
- $D \ 25$

34 Proof
$n$ is an integer.
Which of the following is an even number?

- $A \ (n + 1)(n - 1)$
- $B \ 2n - 1$
- $C \ (n + 1)^2$
- $D \ (n + 1) + (n - 1)$

35 Velocity–time graphs
The velocity–time graph shows the velocity of a runner.

How far did the runner travel in the first 5 seconds of the race?

- $A \ 8$ m
- $B \ 13.5$ m
- $C \ 25.5$ m
- $D \ 51$ m
36 Percentages
Work out 15% of £900

A £145
B £1035
C £135
D £180

\[ \square \] Revise page 59

37 Ratio
The ratio of juice to water in a drink is 3:2
The total amount of drink is 600 ml.
How much juice is in the drink?

A 200 ml
B 360 ml
C 400 ml
D 450 ml

\[ \square \] Revise pages 60, 61

38 Percentage change
In a sale, prices are reduced by 20%.
The sale price of a phone is £144.
Work out its original price.

A £180
B £172.80
C £192
D £115.20

\[ \square \] Revise pages 62, 63

39 Exponential growth
Alison invests £800 in a savings account, which pays 2.5% compound interest.
Work out the amount Alison has in her account after 4 years.
Give your answer to the nearest pound.

A £883
B £861
C £1953
D £880

\[ \square \] Revise page 64

40 Speed
A cyclist travels 84 km at an average speed of 15 km/h.
Work out the total time taken.

A 4.5 hours
B 0.18 hours
C 1260 hours
D 5.6 hours

\[ \square \] Revise page 65

41 Compound measures
The diagram shows a solid brass cuboid.

The density of brass is 8.6 g/cm³.
Work out the mass of the cuboid.

A 498 g
B 27.9 g
C 2064 g
D 14.3 kg

\[ \square \] Revise pages 66, 67, 68

42 Proportionality
y is inversely proportional to x
When x = 40, y = 9.
Work out the value of x when y = 24.

A 106.7
B 15
C 20
D 12

\[ \square \] Revise pages 68, 69, 70
### Geometry and measures

#### 43 Angle properties

Work out the size of the angle marked $x$.

![Diagram with angles $A$, $B$, $C$, $D$, $E$, and $F$, and angle $x$.]

- A 52°
- B 9°
- C 87°
- D 93°

#### 44 Angles in polygons

A is a regular octagon and B is a regular pentagon.

Work out the size of the angle marked $x$.

![Diagram with octagon and pentagon labeled A and B with angle $x$.]

- A 117°
- B 135°
- C 108°
- D 243°

#### 45 Pythagoras' theorem

Work out the length of $BC$ in this right-angled triangle, correct to 1 decimal place.

![Diagram with triangle $ABC$ with sides 18 cm, 23 cm, and hypotenuse $BC$.]

- A 5.0 cm
- B 14.3 cm
- C 29.2 cm
- D 205.0 cm

#### 46 Trigonometry

Work out the size of the angle marked $x$ in this right-angled triangle, to the nearest degree.

![Diagram with triangle $ABC$ with sides 40 cm, 28 cm, and hypotenuse $AC$.]

- A 55°
- B 35°
- C 46°
- D 44°

#### 47 Perimeter and area

Work out the area of this trapezium.

![Diagram with trapezium $ABCD$ with bases 7.2 m and 8.4 m, and height 4.0 m.]

- A 33.6 m²
- B 62.4 m²
- C 31.2 m²
- D 37.2 m²

#### 48 Units of area and volume

Convert 280 cm² into m².

- A 2.8 m²
- B 0.28 m²
- C 28 000 m²
- D 0.028 m²
49 Cylinders

Work out the volume of this cylinder, to the nearest cm³.

- A 377 cm³
- B 1131 cm³
- C 360 cm³
- D 1885 cm³

50 Sectors of circles

The diagram shows a circle with centre O and radius 5 cm.

Work out the area of the shaded sector to 3 significant figures.

- A 26.2 cm²
- B 7.98 cm²
- C 25.1 cm²
- D 627 cm²

51 3D solids

Volume of a pyramid = \( \frac{1}{3} \times \text{base area} \times \text{vertical height} \)

A 3D solid is formed by attaching a pyramid to a cube of side length 9 cm. The height of the whole solid is 20 cm.

Work out the volume of the solid.

- A 540 cm³
- B 1026 cm³
- C 1269 cm³
- D 1620 cm³

52 Transformations

Describe fully the single transformation that maps triangle P onto triangle Q.

- A Reflection
- B Rotation
- C Rotation 180° about (2, 2.5)
- D Reflection in the line \( x = 2 \)

53 Bearings

The bearing of point P from point Q is 208°.

Find the bearing of point Q from point P.

- A 018°
- B 28°
- C 028°
- D 388°

54 Loci and constructions

Which of the following describes the points in the shaded region?

- A Closer to D than A and at least 9 m from AB
- B Less than 3 m from CD and less than 6 m from D
- C At least 9 m from AB and less than 6 m from D
- D Less than or equal to 6 m from D and less than 3 m from CD
**Knowledge check**

### 55 Congruency

Which of the following is **not** a condition of congruency for triangles?

- A  All three angles equal
- B  Two sides and the included angle equal
- C  All three sides equal
- D  Right-angle with hypotenuse and one other side equal

**Revise page 96**

### 56 Similar shapes

The diagram shows two similar triangles.

Find the length of side PR.

- A  18 cm
- B  14.3 cm
- C  20 cm
- D  15.75 cm

**Revise pages 97, 98**

### 58 Lengths in 3D shapes

Work out the length of the long diagonal $AH$ in this cuboid.

- A  17.5 cm
- B  14.4 cm
- C  14.8 cm
- D  15.9 cm

**Revise pages 102, 103**

### 59 Circle theorems

Work out the size of angle $x$.

- A  124°
- B  118°
- C  152°
- D  110°

**Revise pages 104, 105**

### 57 Triangles without right-angles

Work out the length of side $x$.

- A  120.5 cm
- B  7.5 cm
- C  11.0 cm
- D  9.1 cm

**Revise pages 99, 101**

### 60 Vectors

$p = \begin{pmatrix} -2 \\ 5 \end{pmatrix}$ and $q = \begin{pmatrix} 3 \\ -3 \end{pmatrix}$

Work out the vector $p - 2q$

- A  $\begin{pmatrix} 4 \\ -1 \end{pmatrix}$
- B  $\begin{pmatrix} -1 \\ 8 \end{pmatrix}$
- C  $\begin{pmatrix} 4 \\ 8 \end{pmatrix}$
- D  $\begin{pmatrix} 8 \\ 11 \end{pmatrix}$

**Revise pages 106, 107**
Statistics and probability

61 Averages

The table shows the number of goals scored by a team in 40 matches.

<table>
<thead>
<tr>
<th>Goals</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

Work out the mean number of goals scored per match.

- A 2 goals
- B 8 goals
- C 1.25 goals
- D 2.5 goals

62 Interquartile range

The stem-and-leaf diagram shows the weights of 19 satsumas.

6 4 9
7 0 1 5 5 6 9
8 2 4 7 7 7 8 8
9 0 1 3 6

Key: 6 4 means 64 grams

Work out the interquartile range of the weights.

- A 32 grams
- B 75 grams
- C 13 grams
- D 17 grams

63 Graphs

Describe the relationship shown on this scatter graph.

- A exponential decay
- B positive correlation
- C direct proportion
- D negative correlation

64 Collecting data

Which of the following does not describe a random sample.

- A Writing names in alphabetical order and choosing the first ten names
- B Assigning a number to each person and using a random number generator
- C Choosing names out of a hat
- D Asking each person to flip a coin and selecting anyone who gets heads

65 Cumulative frequency

The cumulative frequency graph shows the weights of some eggs.

What was the median weight?

- A 70 grams
- B 69 grams
- C 72 grams
- D 24 grams

66 Box plots

This box plot shows the marks out of 30 for a group of students taking a spelling test.

Which of the following statements is not true?

- A Half the students scored more than 20 marks
- B A quarter of students scored fewer than 25 marks
- C The lowest-scoring student scored 5 marks
- D The interquartile range was 14 marks
14

Knowledge check

67 Histograms

Which of the following is not a true fact about histograms?

A. You can join the midpoints of the top of each bar to make a frequency polygon.
B. The vertical axis is labelled ‘frequency density’.
C. You can have bars of different widths.
D. The height of each bar represents the frequency for that class interval.

Revise pages 120, 121

69 Venn diagrams

A number is chosen at random from this Venn diagram.

A

B

C

D

Work out the probability that it is a member of the set \( A \cup B \).

Revise pages 125, 126

68 Probability

The table shows the probability of each score on a biased dice.

<table>
<thead>
<tr>
<th>Score</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability</td>
<td>0.1</td>
<td>( x )</td>
<td>( x )</td>
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<td>( x )</td>
<td>( 2x )</td>
</tr>
</tbody>
</table>

Ravi rolls the dice. Work out the probability that it lands on 6.

A. 0.2
B. 0.3
C. 0.36
D. 1.2

Revise page 123

70 Conditional probability

A bag contains 3 white counters and 2 black counters.

Two counters are chosen at random without replacement.

Work out the probability that the two counters are the same colour.

A. \( \frac{9}{25} \)
B. \( \frac{13}{25} \)
C. \( \frac{2}{5} \)
D. \( \frac{3}{5} \)

Revise pages 123, 124

Answers to the Knowledge check are on the back cover (page 20) of this booklet.
Use this page to make your own customised catch-up plan. Write down all the pages that you plan to revise, then use the tick boxes to track your progress.

<table>
<thead>
<tr>
<th>Page</th>
<th>Had a go</th>
<th>Nearly there</th>
<th>Nailed it!</th>
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</tbody>
</table>
Use these pages to make any other catch-up notes you need. You could list topics that you know you need extra help with, or make a note of any facts or definitions you are struggling to remember. Or you could use them to record dates and times of catch-up sessions, extra tutorials or study periods.
You can use this chart to help you choose pages for your catch-up plan. Tick the units and topics you want to revise, and then add the pages listed to your plan on page 15.

<table>
<thead>
<tr>
<th>Unit / topic</th>
<th>Revision Guide / Workbook pages</th>
<th>Revise?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit 1: Number</strong></td>
<td></td>
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</tr>
<tr>
<td>Calculations, checking and rounding</td>
<td>4, 6, 13</td>
<td></td>
</tr>
<tr>
<td>Indices, roots, reciprocals and hierarchy of operations</td>
<td>2, 3, 4</td>
<td></td>
</tr>
<tr>
<td>Factors, multiples and primes</td>
<td>1</td>
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<tr>
<td>Standard form and surds</td>
<td>8, 12, 49</td>
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<tr>
<td><strong>Unit 2: Algebra</strong></td>
<td></td>
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<tr>
<td>Algebra: the basics</td>
<td>16, 17, 18, 21, 46</td>
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<tr>
<td>Setting up, rearranging and solving equations</td>
<td>19, 20, 45</td>
<td></td>
</tr>
<tr>
<td>Sequences</td>
<td>22, 23, 24</td>
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<tr>
<td><strong>Unit 3: Interpreting and representing data</strong></td>
<td></td>
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<tr>
<td>Averages and range</td>
<td>110, 111, 112</td>
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<tr>
<td>Representing and interpreting data and scatter graphs</td>
<td>113, 114</td>
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<tr>
<td><strong>Unit 4: Fractions, ratio and proportion</strong></td>
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<td>Ratio and proportion</td>
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<td><strong>Unit 5: Angles and trigonometry</strong></td>
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<tr>
<td>Polygons, angles and parallel lines</td>
<td>73, 74, 75</td>
<td></td>
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<tr>
<td>Pythagoras’ theorem and trigonometry</td>
<td>76, 77, 78, 79</td>
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<td><strong>Unit 6: Graphs</strong></td>
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<tr>
<td>Graphs: the basics and real-life graphs</td>
<td>30, 55</td>
<td></td>
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<tr>
<td>Linear graphs and coordinate geometry</td>
<td>25, 26, 27, 68</td>
<td></td>
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<tr>
<td>Quadratic, cubic and other graphs</td>
<td>28, 29, 36</td>
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If your school follows the Pearson Edexcel two- or three-year scheme of work, you can use the shading on the left-hand side of the table to help you find the topics you are most likely to have missed between spring half term and the summer holiday. You can also check with your teacher to find out exactly which topics you should have covered during lockdown.

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## Knowledge check answers

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