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# Pearson Edexcel GCSE (9–1) Mathematics

# **Higher tier**

## **Revision Workbook**



## **REVISE PEARSON EDEXCEL GCSE (9-1)** Mathematics

### Higher

# REVISION WORKBOOK

## Series Consultant: Harry Smith

Author: Navtej Marwaha

#### Get the inside track

Look out for these features to help turbo-charge your revision:



These questions cover skills and techniques that real students have struggled

with in recent exams. Check out the corresponding Revision Guide page for more top tips and things to watch out for.



We've picked 25 of the hottest topics. These pages contain key skills and knowledge that you're likely to need in your upcoming exams. If you're pushed for time you might want to practise these first.

Where you see this icon, part of the answer Guided has been completed for you.



You will have to use problem-solving skills throughout your exam.

Boxes with this icon will highlight problem-solving skills and strategies to help you stay ahead of the pack.



There is some tough material in GCSE Maths. We've identified 25 of the trickiest topics. You might want to save Tricky these topics for days when you have a Topic bit more time to concentrate on them.



This scale tells you how difficult each question is.

#### A small bit of small print

Pearson Edexcel publishes Sample Assessment Material and the Specification on its website. This is the official content and this book should be used in conjunction with it. The questions have been written to help you practise every topic in the book. Remember: the real exam questions may not look like this.



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## Contents

- Get the inside track i
- ii Contents

#### **NUMBER**

- Factors and primes 1
- 2 Indices 1
- 3 Indices 2
- Calculator skills 1 4
- 5 Fractions
- 6 Decimals
- Estimation
- Standard form 8 (
- Recurring decimals 0
- 10 Upper and lower bounds Accuracy and error
- **A** 11 Surds 1 A 12
- 13 Counting strategies 14
- Problem-solving practice 1 15 Problem-solving practice 2

#### **ALGEBRA**

- 16 Algebraic expressions
- 17 Expanding brackets
- 18 Factorising
- 19 Linear equations 1 20 Linear equations 2
- 21 Formulae
- 22
- Arithmetic sequences 23 Solving sequence problems
- **A** 24 Quadratic sequences
- 25 Straight-line graphs 1
- 26 Straight-line graphs 2
- Parallel and perpendicular 27
- 28 Quadratic graphs
- Cubic and reciprocal graphs 29 Real-life graphs 30
- Quadratic equations 31
- The quadratic formula 32
- **A** 33 Completing the square
- 34 Simultaneous equations 1
- **A** 35 Simultaneous equations 2
- **A** 36 Equation of a circle
- 37 Inequalities
- **A** 38 Quadratic inequalities
- **A** 39 Trigonometric graphs
- **4**0 Transforming graphs
- 41 Inequalities on graphs
- 42 Using quadratic graphs 43
- Turning points 44
- Sketching graphs 45 Iteration
- 46
- Rearranging formulae **A** 47 Algebraic fractions
- **A** 48 Quadratics and fractions
- **A** 49 Surds 2
- Functions 50
- **A** 51 Inverse functions
- 52 Algebraic proof
- **A** 53 Exponential graphs
- 54 Gradients of curves
- **A** 55 Velocity-time graphs
  - 56 Areas under curves
  - 57 Problem-solving practice 1 58 Problem-solving practice 2

#### **RATIO & PROPORTION**

- 59 Calculator skills 2
- 60 Ratio
- 61 Proportion
- 62 Percentage change
- 63 Reverse percentages 64 Growth and decay
- 65 Speed
- 66
- Density
- Other compound measures 67
- 68 Proportion and graphs

- Proportionality formulae
- **A** 70 Harder relationships
- 71 Problem-solving practice 1
- 72 Problem-solving practice 2

#### **GEOMETRY & MEASURES**

Revision

Guide

ISBN 9781447988090

- Angle properties 73
- 74 Solving angle problems
- 75 Angles in polygons
- 76 Pythagoras' theorem
- Trigonometry 1 77
- 78 Trigonometry 2
- **A** 79 Exact trigonometry values
- 80 Perimeter and area
- 81 Units of area and volume
- 82 Prisms
  - 83 Circles and cylinders
  - 84 Sectors of circles
  - Volumes of 3-D shapes 85
  - Surface area 86 87
  - Plans and elevations Translations, reflections and rotations 88
  - 89 Enlargement
  - 90 Combining transformations
  - 91 Bearings
  - 92 Scale drawings and maps
  - 93 Constructions 1
  - 94 Constructions 2
- 95 Loci

98

A 99

96 Congruent triangles

Similar shapes 2

▲ 101 Triangles and segments

108 Problem-solving practice 1

109 Problem-solving practice 2

110 Mean, median and mode

111 Frequency table averages

112 Interquartile range

113 Line graphs

115 Sampling

119 Box plots

▶120 Histograms

123 Probability

▶ 125 Venn diagrams

128 Tree diagrams

**138 Answers** 

KEY

▶ 126 Set notation

114 Scatter graphs

▲116 Stratified sampling

▲117 Capture–recapture

118 Cumulative frequency

121 Frequency polygons

122 Comparing data

124 Relative frequency

▲ 127 Conditional probability

129 Problem-solving practice 1 130 Problem-solving practice 2

131 Paper 1 Practice exam paper

💙 = Hot Topic 🔺 = Tricky Topic

**PROBABILITY & STATISTICS** 

102 Pythagoras in 3-D

103 Trigonometry in 3-D

The sine rule

97 Similar shapes 1

▲ 100 The cosine rule

■ 104 Circle facts

106 Vectors

▲ 107 Vector proof

105 Circle theorems







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**Indices** 2

Target 7	1	Work out the value of			
Guided		(a) $2^{-3}$	(b) 3 <sup>-1</sup>	(c) $7^{-2}$	(d) $4^{-\frac{1}{2}}$
		$\frac{1}{2^3} = \frac{\dots}{\dots}$ (1 mark)	(1 mark)	$\frac{1}{1} = \frac{1}{1}$ (1 mark	) (1 mark)
Target 7	2	Work out the reciprocal	of		
		(a) 3	(b) $\frac{1}{4}$	(c) $\frac{3}{5}$	(d) $\frac{9}{7}$
		(1 mark)	(1 mark)	(1 mark	) (1 mark)
Target 7	3	Work out the value of			
		(a) $\left(\frac{2}{3}\right)^2$	(b) $\left(\frac{4}{3}\right)^3$	(c) $\left(\frac{4}{5}\right)^2$	(d) $\left(\frac{1}{5}\right)^3$
		(1 mark)	(1 mark)	(1 mark	) (1 mark)
Target 7	4	Work out the Tur	n the fraction upside dow	n and change the negativ	ve power to a positive power.
Guided		value of (a) $\left(\frac{4}{3}\right)^{-2} = \left(\frac{3}{4}\right)^2 = \frac{3^2}{4^2}$	$={}$ (1 mark)	(b) $\left(\frac{1}{3}\right)^{-3} = \left(\frac{\dots}{\dots}\right)^{3}$	$=\frac{^{3}}{^{3}}=$ (1 mark)
		(c) $\left(\frac{6}{5}\right)^{-2}$		(d) $\left(\frac{3}{5}\right)^{-3}$	
		(3)	(1 mark)	(3)	(1 mark)
Target 7	5	Work out the value of			
		(a) $25^{\frac{1}{2}}$	(b) $8^{\frac{1}{3}}$	(c) $64^{\frac{1}{3}}$	(d) $81^{\frac{1}{4}}$
		(1 mark)	(1 mark)	(1 mark	) (1 mark)
Target 8 grade	6	Work out the value of			
Guided		(a) $16^{\frac{3}{2}}$		(b) $16^{\frac{3}{4}}$	
Joundary		$(16^{\frac{1}{2}})^3 = ()^3 =$	(1 mark)	$(16^{-1})^{\dots} = (\dots,\dots)^{-1}$	) <sup></sup> = (1 mark)
		(c) $25^{\frac{3}{2}}$		(d) $27^{\frac{2}{3}}$	
		(25 <sup></sup> ) <sup></sup> = () <sup></sup>	= (1 mark)		(1 mark)
Target <b>8</b> grade	7	Show that $8^{\frac{2}{3}} = 16^{\frac{1}{2}}$		Proble	This question says
				to show each	a step of your working clearly.
Target grade	8	$x = 3^m$ and $y = 3^n$	(2 marks)		
		Express in terms of x ar	nd y	$(1)$ $2^{2n}$	
		(a) $5^{m+n}$	<i></i>	(b) $3^{2n}$	
			(1 mark)		(1 mark)

#### NUMBER

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## **Calculator skills 1**

Target grade	1	Work out, in each case giving your answer of to 3 significant figures, (a) $(11 + 8 \div 2)^3$ $(11 +)^3 = (1 mark)$ (b) $(2 + 9 \times 10 + 3)^{\frac{1}{2}}$ (1 mark)	correct	Use BIDMAS to remember the correct order of operations: Brackets Indices Division Multiplication Addition Subtraction	
		(c) $(8 + (3 \times 20) \div 6)^{\frac{2}{3}}$			
		(1 mark)			
Target grade	2	Work out (a) $\frac{(27 + 3 \times 3)^2}{3 \times 2}$	(b) <u>(1</u>	$\frac{3 - \sqrt{12} \div 4)^3}{(4 + 3 \times 2)^2}$	
		(1 mark)			(1 mark)
Target 4	3	Find the value of $\frac{4.5 + 3.75}{3.2^2 - 5.53}$			
Guided		Write down all the figures on your calculate $\frac{8.25}{2}$ =	or display.		(2 marks)
Target grade	4	(a) Find the value of $\sqrt{30.25} + 1.75^2$	Examin report Write your an need to press decimal num	Use your calculator to work of $\sqrt{30.25}$ and $1.75^2$ separately. swers before adding them. You might the SOD button to get your answer per.	ht • as a
		(2 marks)			
		(b) Write your answer to part (a) correct to	o 1 significar	nt figure.	
					(1 mark)
Target grade	5	$m = 7.1 \times 10^6$ and $n = 3.2 \times 10^{-3}$ Work out, in each case giving your answer i	n standard f	form correct to 3 significant figur	:es,
		(a) <i>mn</i>	(b) $\frac{m}{n}$	2	
		(2 marks)		(	(2 marks)
Target <b>4</b> .	6	Work out, in each case giving your answer of	correct to 3 s	significant figures,	
		(a) $\sqrt{5.3 + \tan 38^\circ}$	(b) $\frac{23}{(2)}$	$\frac{88.3 \times \cos 58^{\circ}}{4.23 - 1.13)^3}$	
		(2 marks)			(2 marks)
Target 5 grade	7	$t^3 = \frac{mn}{m-n}$ $m = 4 \times 10^{12}$ $n$ Work out <i>t</i> . Give your answer in standard for	$= 3 \times 10^9$	to 3 significant figures.	

t = ..... (3 marks)



(3 marks)

NUM	B	ER Had a go 🗌 Nea	ed Material early there 🔲 Nailed it! 🗌
Target grade	1	<b>Dec</b> Write these numbers in order of size. Start w $\frac{1}{3}$ 0.3 $\frac{18}{50}$ 0.35	with the smallest number.
Target 5 grade 5 Guided	2	Show that $\frac{3}{20}$ can be written as a terminating decimal. $\frac{3}{20} = \frac{\dots}{100} = \dots$	$(1 \text{ mark})$ Write $\frac{3}{20}$ as an equivalent fraction with denominator 100. (2 marks)
grade <b>Cuided</b>	3	Show that $\frac{1}{30}$ cannot be written as a terminating decimal. $30 = \dots \times \dots \times \dots \times \dots$ By writing the denominator in terms of its p	Write 30 as a product of its prime factors. If the denominator contains a factor other than 2 or 5 then the fraction cannot be written as a terminating decimal. (2 marks) prime factors, state whether the following
		fractions convert to recurring or terminating (a) $\frac{11}{40}$ (1 mark)	(b) $\frac{15}{32}$ (1 mark)
Target <b>C</b>	-	(c) $\frac{22}{39}$ (1 mark)	(d) $\frac{9}{42}$ (1 mark)
grade J	5	Convert the following fractions into decimal. (a) $\frac{11}{40}$ (b) $\frac{6}{25}$	als using short or long division. (c) $\frac{11}{30}$
Target 5 grade	7	The time taken to travel 12 metres by a toy of Sandeep says that the speed of the car is 2.3 Is he correct? Give reasons for your answer.	$(1 \text{ mark}) \qquad (1 \text{ mark}) \qquad (1 \text{ mark})$ $car \text{ is 5 seconds.}$ $375 \text{ m/s.} \qquad \qquad$
Target 5	8	Use the information that $138 \times 85 = 11730$ (a) $1380 \times 85$ (b) $0.133$	(3 marks) ) to find the value of $38 \times 8.5$ (c) $11730 \div 1.38$ (1 mark)
		(1 mark)	(1 mark) (1 mark)



..... (1 mark)





7 x is an integer such that  $1 \le x \le 9$ Prove that  $0.\dot{0}\dot{x} = \frac{x}{99}$ 

..... (3 marks)

NUM	B	Copyrighted M ER Had a go 🗌 Nearly	aterial there 🔲 Nailed it! 🗌
		Upper and lo <sup>.</sup>	wer bounds
Target 5	1	<ul><li>The mass of a bag of cement is 20 kg, correct to th</li><li>(a) Write down the smallest possible mass of the bag of cement.</li></ul>	<ul> <li>(b) Write down the largest possible mass of the bag of cement.</li> </ul>
Target 5	2	<ul> <li>20 - 0.5 = kg (1 mark)</li> <li>The length of a piece of string is 52.3 cm, correct</li> <li>(a) Write down the greatest possible length</li> </ul>	<ul> <li>20 + = kg (1 mark)</li> <li>to 1 decimal place.</li> <li>(b) Write down the least possible length</li> </ul>
Guided Cuided	3	of the piece of string. $52.3 + 0.05 = \dots $	of the piece of string. $52.3 - \dots = \dots $ (1 mark) set is calculated using the formula
Guided	5	The kinetic energy $= \frac{1}{2}mv^2$ The mass ( <i>m</i> ) of the object is 2.6 kg, to the nearest tenth of a kilogram. The velocity ( <i>v</i> ) of the object is 32.7 m/s, correct to Find the lower bound and the upper bound of th Give your answer correct to 3 significant figures.	Use the rules of multiplication when finding upper and lower bounds. to 3 significant figures. e kinetic energy, in joules, of the object.
		Lower bound of mass = Lower bound of velocity = $\frac{1}{2}mv^2$ = J	Upper bound of mass = Upper bound of velocity = $\frac{1}{2}mv^2$ = =J (3 marks)
Target <b>8</b> grade	4	An experiment is carried out to measure the densit The mass of the rolled lead is 572 grams, correct The volume of the rolled lead is 50.2 cm <sup>3</sup> , correct Use the formula density = $\frac{\text{mass}}{\text{volume}}$ to find the rand density of rolled lead, in g/cm <sup>3</sup> . Give your answers correct to 4 significant figures.	ty of rolled lead, in g/cm <sup>3</sup> . to the nearest gram. to 3 significant figures. ge of possible values for the
Target <b>8</b> grade	5	A ball is thrown vertically upwards with a speed v metres per second. The height, H metres, to which it rises is given by the formula $H = \frac{v^2}{2g}$	(3 marks) Problem You are dividing by g. So to find the upper bound for H you need to use the lower bound for g.

where  $g \text{ m/s}^2$  is the acceleration due to gravity. v = 35.3 m/s correct to 3 significant figures and  $g = 9.8 \text{ m/s}^2$  correct to 2 significant figures.

Calculate the upper bound of H. Give your answer correct to 3 significant figures.

..... (2 marks)





ow many combinations can Craig choose?	
	(2 marks)
ck has a code for his money box. The code consists ree letters. The digits and the letters can be repeated. T ick says that there are more than one million differer	of two digits followed by he digits are the numbers 0 to 9. ht possible codes.
he correct? You must show your working.	How many digits are there?
ligit digit letter letter letter	How many letters are there?
10 × × 26 × × =	
he diagrams show keypads for two different types of ach keypad has a four-key code.	alarm.
Premier alarm keypadI 2 3 4 5 $6 7 8 9 0$ A B C	Problem In part (b), the number of choices for the first two key-presses is different from the number of choices for the second two key-presses.
<ul><li>a) How many different codes are possible for the</li><li>(i) Classic alarm keypad (ii)</li></ul>	Premier alarm keypad?
······	(2 marks)
) The Premier alarm keypad is then programmed so four-key code must start with two letters, followed Show that there are fewer than 1000 codes possible	o that the 1 by two digits. le.

NUMBER

<ul> <li>I mily has four tiles:</li> <li>I mily chooses two of these tiles. Write down all the possible combinations she can get.</li> <li>I and the possible context (S), a white shirt (S) and a pink shirt (PS). He also has a yellow tie (YT), ared tie (RT) and an orange tie (OT). Craip picks a shirt and a the combination at random. How many combinations can Craig choose?</li> <li>I ack has a code for his money box. The code consists of two digits followed by three letters. The digits and the letters can be repeated. The digits are the numbers 0 to 9. Jack says that there are more than one million different possible codes. Is he correct? You must show your working.</li> <li>I ack has a code for his money box. The code consists of two digits followed by three letters. The digits and the letters can be repeated. The digits are the numbers 0 to 9. Jack says that there are more than one million different possible codes. Is he correct? You must show your working.</li> <li>I digit letter letter letter How many letters are there?</li> <li>I ack has a four keypads for two different types of alarm. Each page has a four keypad.</li> <li>I digit letter letter letter letter Mow many letters are there?</li> <li>I ack has a four keypad.</li> <li>I ack has a four keypad.</li> <li>I classic alarm keypad</li> <li>I a back has a four keypad.</li> <li>I ack has a four keypad.</li> <li>I ack has a four keypad.</li> <li>I ach back as a four keypad.<!--</th--><th></th><th></th><th><b>Counting stra</b></th><th>tegi</th><th>es</th></li></ul>			<b>Counting stra</b>	tegi	es
W       X       Y       Z         Enlight chooses two of these tiles.       The down all the possible combinations she can get.       Image: Combination of the set tiles.       Image: Combination of the set tiles.         Image: Combination of the set tiles.       Image: Combination of the set tiles.       Image: Combination of the set tiles.       Image: Combination of the set tiles.         Image: Combination of the set tiles.       Image: Combination of the set tiles.       Image: Combination of the set tiles.       Image: Combination of the set tiles.         Image: Combination of the set tiles.       Image: Combination of the set tiles.       Image: Combination of the set tiles.       Image: Combination of the set tiles.         Image: Combination of the set tiles.       Image: Combination of the set tiles.       Image: Combination of the set tiles.       Image: Combination of the set tiles.         Image: Compare of the set tiles.       Image: Combination of the set tiles.       Image: Combination of the set tiles.       Image: Combination of the set tiles.         Image: Compare of the set tiles.       Image: Compare of the set tiles.       Image: Compare of the set tiles.       Image: Compare of the set tiles.         Image: Compare of the set tiles.       Image: Compare of the set tiles.       Image: Compare of the set tiles.       Image: Compare of the set tiles.       Image: Compare of the set tiles.         Image: Compare of the set tiles.       Image: Compare of the set tiles.	Target <b>7</b> grade <b>7</b>	1	Emily has four tiles.	_	
Emily chooses two of these tiles.       Write down all the possible combinations she can get.         Image: The second seco			W X Y Z	Z	
Image: Constraint of the second set of the second se			Emily chooses two of these tiles. Write down all the possible combinations she can get.		
Asha, Bey, Chloe and Dan are playing in a competition. Each player must play each other once. How many games will be played in total? Label Asha, Bey, Chloe and Dan as A. B. C and D respectively. Remember (A, B) is the same as (B, A). (A,) (A,) (B,)					(2 marks)
Cuided       How many games will be played in total?       Remember (A, B) is the same as (B, A).         (A,	Target 7 grade 7	2	Asha, Bev, Chloe and Dan are playing in a competition. Each player must play each other once.	Label As B, C and	ha, Bev, Chloe and Dan as A, D respectively.
(A,) (A,) (B,)       (2 mark         (A,) (A,) (B,)       (2 mark         (A,) (A,) (B,)       (C mark         (A,) (A,) (B,)       (C mark         (A,) (A,) (B,)       (C mark         (A,	Guided		How many games will be played in total?	Rememb	er (A, B) is the same as (B, A).
Image: Second Secon			(A,) (A,) (A,) (B,)		(2 marks)
Image: 2013       4 Jack has a code for his money box. The code consists of two digits followed by three letters. The digits and the letters can be repeated. The digits are the numbers 0 to 9. Jack says that there are more than one million different possible codes. Is he correct? You must show your working.       How many digits are there?         digit       digit       letter       letter       How many digits are there?         digit       digit       letter       letter       How many letters are there?         look       look       look       look       look         digit       letter       letter       letter?       How many letters are there?         look       look       look       look       look       look         look       look       look       look       look       look         look       look       look       look       look       look       look         look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look       look <td< td=""><td>Farget <b>8</b> grade</td><td>3</td><td>Craig has a black shirt (BS), a white shirt (WS) and a pink He also has a yellow tie (YT), a red tie (RT) and an orange Craig picks a shirt and a tie combination at random. How many combinations can Craig choose?</td><td>shirt (PS) e tie (OT).</td><td></td></td<>	Farget <b>8</b> grade	3	Craig has a black shirt (BS), a white shirt (WS) and a pink He also has a yellow tie (YT), a red tie (RT) and an orange Craig picks a shirt and a tie combination at random. How many combinations can Craig choose?	shirt (PS) e tie (OT).	
Image: 2010       4 Jack has a code for his money box. The code consists of two digits followed by three letters. The digits and the letters can be repeated. The digits are the numbers 0 to 9. Jack says that there are more than one million different possible codes. Is he correct? You must show your working.         Image: 2010       Image: 2010         digit       letter         digit       letter         letter       letter         Image: 2010       Image: 2010         digit       letter         letter       letter         lot x       2.6 x         Jack is       2.6 x         Jack is       (2 marks)         Jack is       (2 marks)         Target 8       5 The diagrams show keypads for two different types of alarm. Each keypad has a four-key code.         Premier alarm keypad       Image: 2010         Image: 2010       Image: 2010					(2 marks)
How many digits are there? digit digit letter letter $10 \times \dots \times 26 \times \dots \times \dots = \dots$ Jack is	Target 8 grade 8	4	Jack has a code for his money box. The code consists of tw three letters. The digits and the letters can be repeated. The di Jack says that there are more than one million different por Is he correct? You must show your working	vo digits fo gits are the ssible code	ellowed by e numbers 0 to 9.
digit       letter       letter       How many letters are there?         10 × × 26 × × =			ione contect. Tou must show your working.		How many digits are there?
10 ×			digit digit letter letter letter		How many letters are there?
Jack is       (2 mark)         Farget State       5       The diagrams show keypads for two different types of alarm. Each keypad has a four-key code.       Premier alarm keypad       Image: Classic alarm keypad       Image: Display transmission of the first two key-presses is different from the number of choices for the first two key-presses is different from the number of choices for the second two key-presses.         (a) How many different codes are possible for the       (i) Classic alarm keypad       (ii) Premier alarm keypad?			10 × × 26 × × =		
5 The diagrams show keypads for two different types of alarm. Each keypad has a four-key code. Premier alarm keypad Classic alarm keypad 1 2 3 4 5 6 7 8 9 0 (a) How many different codes are possible for the (i) Classic alarm keypad (ii) Premier alarm keypad? (2 market)	Target		Jack is		(2 marks)
Premier alarm keypad Classic alarm keypad 1 2 3 4 5 6 7 8 9 0 (a) How many different codes are possible for the (i) Classic alarm keypad (i) Premier alarm keypad (ii) Premier alarm keypad? (ii) Premier alarm keypad?	grade O	5	The diagrams show keypads for two different types of alar Each keypad has a four-key code.	m.	
Classic alarm keypad $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			Premier alarm keypad		Problem In part (b), the
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			Classic alarm keypad 1 2 3 4 5	O Č Š	number of choices
<ul> <li>(a) How many different codes are possible for the</li> <li>(i) Classic alarm keypad</li> <li>(ii) Premier alarm keypad?</li> </ul>			1       2       3       4       5         6       7       8       9       0         A       B       C	differe for the	nt from the number of choices e second two key-presses.
(i) Classic alarm keypad (ii) Premier alarm keypad?			(a) How many different codes are possible for the		
() marks			(i) Classic alarm keypad (ii) Pres	mier alarn	n keypad?
					(2 marks)

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## **Problem-solving practice 1**

 1 A machine makes 48 bolts every hour. The machine makes bolts for 7<sup>1</sup>/<sub>2</sub> hours each day, on 5 days of the week. The bolts are packed into boxes. Each box holds 30 bolts. How many boxes are needed for all the bolts made each week?



 $x = \dots \qquad (2 \text{ marks})$ 



Give a reason for your answer.

#### (5 marks)

6 A large rectangular piece of card is  $(5 + \sqrt{8})$  cm long and  $(\sqrt{2} + 2)$  cm wide. A small rectangle  $\sqrt{6}$  cm long and  $\sqrt{3}$  cm wide is cut out of the piece of card.



Work out the shaded area, in cm<sup>2</sup>. Give your answer in the form  $a\sqrt{2} + b$  where *a* and *b* are integers.

ALGEBRA

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# **Algebraic expressions**

Target grade	1	Simplify fully		
		(a) $m \times m \times m$	(b) $d \times d \times d \times d$	(c) $e \times e \times e \times e \times e$
> Guided >		m <sup></sup> (1 mark)	d (1 mark)	<i>e</i> <sup></sup> (1 mark)
Target grade	2	Simplify		
		(a) $x^4 \times x^7$	(b) $y^7 \div y^2$	(c) $t^5 \times t^6 \div t^7$
<b>Guided</b>		$x^{\dots + \dots} = x^{\dots}$ (2 marks)	$y^{} = y^{}$ (2 marks)	(2 marks)
Target 5	3	Simplify fully		
gruue	0	(a) $(x^{3})^{2}$	(b) $(y^5)^3$	(c) $(t^{3})^{7}$
<b>Cuided</b>		$x^{} \times = x^{}$ (1 mark)	(2 marks)	(2 marks)
Target				(2 murks)
grade 🔾	4	Simplify fully $x^3 \times x^4$	$(1-)$ $y^{14}$	$(t^7)^2$
Guided		(a) $\frac{1}{x^2}$	(b) $\frac{1}{y^3 \times y^2}$	(c) $\left(\frac{1}{t^4}\right)$
		$\frac{x_{\dots}^{+} \dots}{x_{n}^{2}} = x^{\dots}^{-} \dots$		
		$x^{-}$ = $x^{\cdots}$ (1 mark)	(2 marks)	(2 marks)
Target <b>C</b>	_			
grade J	5	Simplify fully (a) $7wu^3 \times 4w^2u^4$	(b) $\frac{16x^4y^3}{16x^4y^3}$	(a) $(2x^2x^5-3)^4$
		(a) $7xy^{3} \times 4x^{2}y^{3}$	(b) $\frac{1}{8xy^2}$	(c) $(5x^2y^2z^2)^2$
		(2 marks)	(2 marks)	(2 marks)
Target <b>7</b> grade	6	Simplify fully	3	1
		(a) $(25x^6)^{\overline{2}}$	(b) $(16x^3y^4)^2$	(c) $(81x^5y^3)^{\overline{4}}$
		(2 marks)	(2 marks)	(2 marks)
grade	7	Simplify fully $(1)^{-2}$	/ <u>+</u>	<u> </u>
		(a) $\left(\frac{1}{3x^4}\right)^{-1}$	(b) $\left(\frac{25}{64x^4y^{10}}\right)^2$	(c) $\left(\frac{27}{64x^3y^9}\right)^{-3}$
		(2 marks)	(2 marks)	(2 marks)



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## **Factorising**

Target grade	1	Factorise			
		(a) $3x + 6$	(b) 2 <i>p</i> – 6		(c) $5y - 15$
Guided		$= 3(\dots + \dots)$ (1 mark)		(1 mark)	$= 5(\dots, -\dots)$ (1 mark)
Target					
grade <b>G</b>	2	Factorise	$(1)$ $2$ $\cdot$ $4$		() 2 12
		(a) $x^2 + 6x$	(b) $x^2 + 4x$		(c) $x^2 - 12x$
Guided		= x(+) (1 mark)	•••••	(1 mark)	= x() (2 marks)
Target 5 grade 5	3	Factorise fully			(Factorics fully, means that you)
		(a) $3p^2 + 6p$	(b) $8y^2 - 24y$		need to take out the highest
<b>Guided</b>		= 3p() (1 mark)		(2 marks)	common factor (HCF).
Target					
grade J	4	Factorise fully $(-)$ $4d^2 + 12d$	(1-) (? 10		If you wrote $4d^2 - 12d = 4(d^2 - 3d)$
		(a) $4a^2 + 12a$	(b) $6x^2 - 18x$		you would not have factorised
		(2 marks)		(2 marks)	both terms.
Target	5	Footorico			
grade J	3	$\begin{array}{c} racionse\\ (a)  r^2 + 4r + 3 \end{array}$	(b) $x^2 + 11x + 10$		You need to find two numbers
Guided		$\begin{array}{c} (a)  x  + +x + 3 \\ x  = +3 \end{array}$	(0) x + 11x + 10 x = +10		that multiply to give 3 and add up to give 4.
		+ = +4	+ = +11		
		$\frac{1}{x^2 + 4x + 3} = (x + x)(x + x)$	$x^{2} + 11x + 10 = 0$	×	$)(\mathbf{x})$
		(7 morks)		() marks)	
Towned C		(2 marks)		(2 mai ks)	
grade	6	Factorise			
		(a) $x^2 + 6x - 7$	(b) $x^2 + 4x - 5$		(c) $x^2 - 2x - 15$
		(2 marks)	•••••	(2 marks)	(2 marks)
Target 5	7	Factorise			
		(a) $x^2 - 9$	(b) $x^2 - 144$		This is a difference of two squares. You can use the rule
Guided		a = x, b = 3			$a^2 - b^2 = (a + b)(a - b)$
		$x^2 - 9 = (x + \dots)(x - \dots)$			
		(2 marks)		(2 marks)	
Target			••••••	(= mar K5)	
grade <b>J</b>	8	Factorise	_		_
		(a) $3x^2 - 7x + 2$	(b) $2x^2 - x - 3$		(c) $3x^2 - 16x - 12$

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## Linear equations 1

1 Solve (c) 26 = 7q - 9(a) 3x + 1 = 13(b) 5x - 3 = 27Guided 3x + 1 = 13 (-1) 3x = 13 - 1 $3x = \dots (\div 3)$ x = ..... (1 mark) x = ..... (1 mark) q = ..... (1 mark) (f)  $\frac{d}{3} + 2 = -4$ (e)  $\frac{t}{6} - 7 = 3$ (d) 12x + 18 = 66x = ..... (1 mark) t = ..... (1 mark) d = ..... (1 mark) Multiply out the brackets. 2 Solve (a) 3(3x+5) = 42(b) 5(2x + 3) = 35(c) 5(x-3) = -25Guided 9*x* + ..... = 42  $9x = 42 - \dots$  $9x = \dots \qquad (\div 9)$ x = ..... (2 marks) x = ..... (2 marks) x = ..... (2 marks) (f) 3(10 - 4x) = 45(d) 4(5x + 7) = 16(e) 3(4x + 13) = 51x = ..... (2 marks) x = ..... (2 marks)  $x = \dots$  (2 marks) Collect all the *x* terms on one side. 3 Solve (b) 7y + 15 = 4y - 6(c) 4t - 6 = 2t + 18(a) 2x + 3 = x + 7x = ..... (2 marks) y = ..... (2 marks)  $t = \dots$  (2 marks) (d) 2(x+3) = x+10(e) 5(x-4) = 3(x+2)(f) 3(2v - 4) = 2(6 - 3v)x = ..... (2 marks) x = ..... (2 marks) y = ..... (2 marks)

4 Carl buys 8 bags of marbles. Each bag contains *m* marbles. He plays his friend and wins another 7 marbles. When Carl gets home, he counts his marbles and finds that he has 103 marbles altogether. Calculate the value of *m*. You must show all of your working.

**Examiners'** Don't use trial and improvement! Form an equation in *m* and solve it. Carl starts with 8*m* marbles, then adds 7 to get 103.

 $m = \dots$  (3 marks)

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*x* = ..... (3 marks)