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revise edexcel gcse (9–1) Mathematics

Foundation



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Contents

NUMBER

- Place value
- 2 Negative numbers
- 3 Rounding numbers
- 4 Adding and subtracting
- 5 Multiplying and dividing 6 Decimals and place value
- 7 Operations on decimals
- 8 Squares, cubes and roots
- 9 Indices
- 10 Estimation
- Factors, multiples and primes 11
- 12 HCF and LCM
- Fractions 13
- 14 Operations on fractions
- 15 Mixed numbers
- Calculator and number skills 16
- 17 Standard form 1
- 18 Standard form 2
- 19 Counting strategies
- 20 Problem-solving practice 1
- 21 Problem-solving practice 2

ALGEBRA

- 22 Collecting like terms
- 23 Simplifying expressions
- 24 Algebraic indices
- 25 Substitution
- 26 Formulae
- 27 Writing formulae
- 28 Expanding brackets
- 29 Factorising
- 30
- Linear equations 1 Linear equations 2 31
- 32 Inequalities
- 33 Solving inequalities
- 34 Sequences 1
- 35 Sequences 2
- 36 Coordinates
- 37 Gradients of lines
- 38 Straight-line graphs 1
- 39 Straight-line graphs 2
- 40 Real-life graphs
- 41 Distance-time graphs
- Rates of change 42
- Expanding double brackets 43
- 44 Quadratic graphs
- 45 Using quadratic graphs
- Factorising quadratics 46
- Quadratic equations 47
- 48 Cubic and reciprocal graphs
- 49 Simultaneous equations
- 50 Rearranging formulae
- 51 Using algebra
- 52 Identities and proof
- 53 Problem-solving practice 1
- 54 Problem-solving practice 2

RATIO & PROPORTION

- Percentages 55
- 56 Fractions, decimals and percentages
- Percentage change 1 57
- 58 Percentage change 2
- 59 Ratio 1
- 60 Ratio 2
- 61 Metric units
- 62 Reverse percentages
- 63 Growth and decay
- 64 Speed
- 65 Density
- 66 Other compound measures
- 67 Proportion
- 68 Proportion and graphs
- 69 Problem-solving practice 1
- 70 Problem-solving practice 2

GEOMETRY & MEASURES

- Symmetry 71
- 72 Quadrilaterals

- 73 Angles 1 74 Angles 2
- 75 Solving angle problems

ch with the

Revision

Guide

ISBN 9781447988045

- 76 Angles in polygons
- 77 Time and timetables
- 78 Reading scales
- 79 Perimeter and area
- 80 Area formulae
- 81 Solving area problems
- 82 3D shapes
- Volumes of cuboids 83
- 84 Prisms
- 85 Units of area and volume
- 86 Translations
- 87 Reflections
- 88 **Rotations**
- 89 Enlargements
- 90 Pythagoras' theorem
- 91 Line segments
- 92 Trigonometry 1
- 93 Trigonometry 2
- 94 Solving trigonometry problems
- 95 Measuring and drawing angles

Scale drawings and maps

96 Measuring lines 97 Plans and elevations

Constructions 1

Constructions 2

104 Area of a circle

105 Sectors of circles

107 Volumes of 3D shapes

111 Congruent triangles

109 Similarity and congruence

113 Problem-solving practice 1

114 Problem-solving practice 2

PROBABILITY & STATISTICS

98

99

100

101 Loci

102 Bearings

106 Cylinders

112 Vectors

108 Surface area

110 Similar shapes

115 Two-way tables

119 Scatter graphs

123 Line graphs

125 Sampling

120 Averages and ranges

121 Averages from tables 1 122 Averages from tables 2

124 Stem-and-leaf diagrams

131 Frequency and outcomes

134 Problem-solving practice 1

135 Problem-solving practice 2

136 Paper 1 Practice exam paper

Edexcel publishes Sample Assessment Material and the

Specification on its website. This is the official content and this book

have been written to help you practise what you have learned in your

revision. Remember: the real exam questions may not look like this.

should be used in conjunction with it. The questions in this book

Venn diagrams

133 Independent events

A small bit of small print

126 Stratified sampling

127 Comparing data 128 Probability 1

129 Probability 2 130 Relative frequency

143 Answers

132

116 Pictograms

117 Bar charts

118 Pie charts

103 Circles

NUMBER

Place value

	1	(a) Write the m	umber twenty-five	e thousand, three	e hundred and two	o in figures.	
VIV		2					(1 mark)
		(b) Write the m	umber 12317 in v	vords.			
		Twelve thou	usand,				(1 mark)
		(c) Write down	the value of the	7 in the number	327 332.		
		7					(1 mark)
	2	Complete the pl	ace value table sł	nowing nineteen	thousand and sixt	y-one.	
		10000s			10s		
		1				1	(2 marks)
	3	Write the follow	ing numbers in o	rder starting wit	h the lowest numb)er	
	5	(a) $251 \ 209 \ 21$	9 199 211	ider starting wit	in the lowest nume		
		(a) 231, 209, 21 199	, 177, 211				(1 mark)
		(b) 3711 3010	3000 3118 3706		The 'theusends' ar	all the same	(1
		3099	5099, 5110, 5790		Look at the values	of the 'hundreds'.	(1 mark)
	1	Write the measu	rements in order	of size starting	with the smallest		(1 mark)
	4	(a) 31851 km	$\frac{1809 \text{ km}}{31787}$	$km = 29.738 km^{-2}$	$2001 \mathrm{km}$		
Gu ² , ed		(<i>d</i>) 51051 Km,	1 009 km, 51 707	Kiii, 27750 Kiii, 5	2 001 Km		
-							(1 mark)
		(b) 5.75m, 5.09	9m, 5.11m, 5.8m	, 5.92 m			
							(1 mark)
	5	The weekly poc	ket money of six	children has bee	n recorded. Which	two amounts	
Gu ⁷ , ed		£6.10, £6.25, £6	.70, £6.55, £6.35,	£6.85	ie in order?		
							(1 mark)
				1 1			(1
	6	A teacher has be A packet of 12	een given £35 to s pencils costs £2.1	spend on pencils 5.	and rulers.	You will need to u	
Gu[‡] , ed		A pack of 30 ru	lers costs £6.00.			throughout your	
PROBLEM		She buys 4 pack	s of rulers and spread spre	bends the rest on she buy?	packets of pencils	S be prepared!	
SOLVED!		now many pack	ces or periors car	1 5110 Ouy:			

(2 marks)

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Negative numbers

	1	(a)	Write the following numbers in o	rder, smalles	t firs	it.		
			8, -5, -12, 0, 3	Use the that any	fact ' neg	that –12 is smaller ative number is sm	than -5, and haller than 0.	(1 mark)
		(b)	Solve the following.					
			(i) -13 + 4		_			
			= -(13 - 4) =		F	Remember that –7	+ 3 = -(7 - 3).	(1 mark)
			(ii) -412					
			= -4 + =	(Reme	embe	er that -37 = -3	3 + 7 = 7 - 3.	(1 mark)
			(iii) -20 - 10					
			= -(20 +) =					(1 mark)
			(iv) -15 - +7					
			=			Remember that	-3 - +7 = -10.	(1 mark)
	2	Sol	ve the following.					
VIV VIV		(a)	-15 - +7		(b)	56 ÷ -8		
			= -15 - 7 =	(1 mark)		$= -(56 \div 8)$	=	(1 mark)
		(c)	-7×-7		(d)	$-64 \div -4 =$		
			= 7 × 7 =	(1 mark)				(1 mark)
	3	On 6 pr by 1	a certain day in Helsinki, the tempe m it had dropped by 8 °C. By 9 pm i midnight it had dropped a further 7	rature at noo t had dropped °C. Find the t	n wa d a fi temp	as 6°C. By aurther 7°C and peratures at	You can see each temperature drop subtraction of th	o as a e number
		(a)	(i) 6 pm		(ii)	9 pm	of degrees each t	ime.
			$6^{\circ}C - 8^{\circ}C = -2^{\circ}C$	(1 mark)		-2°C - 7°C.	°C	(1 mark)
			(iii) midnight		(b)	What was the o	verall drop in	
			°C			temperature fro	m noon to midn	ight?
				(1 mark)		°C		(1 mark)
	4	Th	a fallorring table lists the elevation			laval in matrice)	of aiting around	



4 The following table lists the elevation (above/below sea level in metres) of cities around the world.

Prague	Tokyo	Amsterdam	Nairobi	Baku
244 m	17 m	-2 m	1728 m	-28 m

(a) What is the difference in elevation between Prague and Amsterdam?

.....

(b) Another city has an elevation halfway between that of Tokyo and Prague. What is its elevation?

(2 marks)

(1 mark)

NUMBER

Rounding numbers

	1	Round		
	1	(a) 11340 (nearest hundred)	When rounding to the nearest 'hun	idred', look at
		(a) 11 549 (nearest nundred)	'up' or leave alone.	
		= 11		(1 mark)
		(b) 13459 (nearest thousand)	Always go to the place value colum	in to the right of
		= 1	the column to be rounded to make	your decision. (1 mark)
		(c) 21997 (nearest ten)		
		= 2		(1 mark)
	2	Round 0.003272 correct to		
		(a) 1 significant figure	vour significant figures answer. Th	e final one may
			increase by 1 (or stay the same) wh	nen it is rounded. (1 mark)
		(b) 3 significant figures		()
		(b) 5 significant ligures		(1 mark)
				(1 mark)
		(c) 2 significant figures		
				(1 mark)
	3	Round 361712 correct to		
		(a) 1 significant figure		
		400000		(1 mark)
		(b) 2 significant figures		
		= 3 0.000		(1 mark)
		(a) 2 aignificant frauna		(1
		(c) 3 significant figures		(1 1)
				(1 mark)
	4	Three athletes, A, B and C, recorded	ed times for the 100 m sprint. The	ir times were
		11.051, 10.923, and 11.114, respect	tively.	
∕ Gu⁺. ed		(a) Round B to 3 significant figure	es. (b) Round C to 2	2 significant figures.
			(1 mark)	(1 mark)
		(c) How many significant figures	must they all be rounded to in ord	er for the times
		to all be the same?		
				(1 mark)
	5	Hans checked his bank account wh	hich said he had €342 617	N 10 17
	U	He said he had €343000 to 3 signif	ficant figures. Explain why	problem-solving skills
Gu [‡] . ed		you think he was either correct or	incorrect.	throughout your exam
PROBLEM				se prepared.
SOLVED!				
				(2 marks)

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Adding and subtracting

	1	Work out			
		(a) 556 + 19 + 375	Remember, when the	sum of the digits exceeds 9	
		556	you carry the digit to	the left place value.	
		19			
		<u>+ 3 / 5</u> 0			
		2			
					(1 mark)
		(b) 804 – 257			
		7914 804			
		-257			
		<u>7</u>			
					(1 mark)
	2	Work out			
		(a) 4095 + 5863			
					(1 mark)
		(b) 9191 – 2658			
					(1 mark)
	3	A packet of pizza flour costs $\pounds 1.52$ mozzarella cheese cost $\pounds 1.13$ each with a $\pounds 10$ note. Work out how mu	2, 2 cans of tomatoes cos and a packet of oregand ach change there will be.	st £0.58 each, 4 bags of o costs £0.94. Alex pays	
		152 + (2 × 58) + (4 × 113) +	94 =	Convert everything to	
		1000 =		pence, then convert back to pounds at the end.	
					(3 marks)
	4	A bus leaves Guildford station wit get off and 15 others get on. How	h 63 passengers on boar many passengers are on	d. At the next stop, 37 peop board now?	le
		Method 1 the origin Method 2 then subt	: subtract the number of pa al 63 then add the number : subtract the 15 passenger tract the result from the ori	assengers who get off from r of passengers who get on. rs from the 37 that get off, iginal 63.	
					(2 marks)
	5	Manny needs to buy a saw for £3.2	24, a bag of nails for £1.	61 and a hammer costing	
Gur , ed		£5.38. He says a £10 note will be e your reasoning.	nough to get all three ite	ems. Is he correct? Explain	
v —					(3 marks)

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Nailed it!

NUMBER

Multiplying and dividing

- 1 Work out
 - (a) 35×42

Had a go

The answer to 35×40 goes here. First write 0 in the units position, now work with the 4 (tens). Work out 4×5 (tens), write down the 0 in the tens position and carry the 2 (hundreds). Then work out 4×3 (hundreds), add on the 2 and write this result in the hundreds and thousands positions. This can be done by multiplying 35×2 , multiplying 35×40 and adding the two results together.



(1 mark)

(b) 292 ÷ 4

Reading the digits 292 from left to right gives three numbers 2, 29 and 292. The smallest that can be divided by 4 is 29. Work out how many 4s go into it: $7 \times 4 = 28$ giving a remainder of 1. Write the 7 (tens) on the top above the 9 (tens).

(1 mark)

(1 mark)

(3 marks)

- 2 Pens come in three packaging sizes: a packet, a bag and a box. A packet contains 8 pens, a bag contains 4 times more, and a box contains 3 times more than that.
 - (a) Calculate how many pens are in a box.

 $= 8 \times 4 \times \dots = \dots$

(b) Calculate how many pens you would have, if you had one of each packaging size.

= 8 + + =

3 A farmer filled 26 boxes with carrots

from a small field. Each box contained

27 kg of carrots. What was the total weight of carrots from his field?





Write any remainder as a fraction.

Remember you are looking for how many 'groups' of 11 there are in each place holder so any remainders will be 11ths.

(2 marks)

- **5** A lorry had a cargo of 600 bags of flour. Each bag weighed 8 kg. The driver delivered 240 bags to a supermarket and the rest was shared between 9 small shops.
- You will need to use problem-solving skills throughout your exam – **be prepared!**

- (a) What was the total weight of the flour in the lorry?
- (b) How many kg of flour did each smaller shop get?

flour

OLVED

26

₄ 2

× 27

..... (1 mark)

(3 marks)

Decimals and place value

Had a go

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 Nearly there
 Nailed it!

	1	(-) White dense the color of A is 1	04	_		
	1	(a) write down the value of 4 in 1	.04	Fo	or example, in 1.27 the 2	
		= 4		re	presents the value 2 tenths.	(1 mark)
		(b) Write down the value of 2 in 0	.326	Fa	ich place-holder is ten times	
		= 2		sn	naller every move to the right,	(1 mark)
		(c) Write down the value of 3 in 5	.003	so	we have hundreds, tens,	
		· · · · · · · · · · · · · · · · · · ·		L		(1 mark)
	2	XX 7'4 41 C 11 ' 1 ' 1	1 6 '	, <u>,</u>		
	2	8.3, 4.9, 6.7, 8.2, 7.6	ier of size s	tarting wi	th the smallest.	
Gu ² , ed		,,,,				(1 mark)
				Start by lo	oking at the first place holder	(1 mark)
ĘÇŢ	3	Write down the following numbers	in order	in every nu	umber to identify the largest	
Ŷ		1 532 1 499 1 53 1 6 1 504		holder, the	en the third and so on.	
		1.002, 1.199, 1.00, 1.001	1 / 90	3)	(1 mark)
			1.400			(1 Шагк)
	4	Write down the following numbers	in order, si	nallest firs	it.	
Gui ed		0.81, 0.8, 0.08, 0.788, 0.019				(1 1)
Jourcu						(1 mark)
	5	Use the information $1.2 \times 9.3 = 11$.16 to write	e down the	e value of	
		(a) 1.2×93			10 times langer than 1.2	
				is is exactly	10 times larger than 1.2 × 9.3.	(1 mark)
		(b) 0.12×0.2		0 12 is 10	times smaller than 1.2 so the	
		$(0) \ 0.12 \times 9.5$		result sho	uld be 10 times smaller also.	(1 1)
						(1 mark)
		(c) 120×0.93	120 is 100 ti	mes larger t	han 1.2 and 0.93 is 10 times	
			smaller than divide by 10	i 9.3. If you n it is the sam	nultiply something by 100 then ne as just multiplying by 10.	(1 mark)
		(d) $11.16 \div 0.12$,,,,	
		(4) 11.10 · 0.12				
		From the fact you are given, 1	1.16 ÷ 1.2 =	9.3. Since 0.	.12 is 10 times smaller than	
		1.2, and you are dividing by the	nis smaller n	umber, the	result will be 10 times bigger.	
						(1 mark)
	6	Using the fact that $10 \times 21 = 300$	change only	v one of		
	U	the numbers in the following to ma	ike it correct	et.	problem-solving skills	
Gu [‡] . ed		$39.9 \div 0.21 = 0.019$			throughout your exam	
DROBLEM					– be prepared!	
SOLVED!						() marks)

(2 marks)

NUMBER

Operations on decimals



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Squares, cubes and roots

	1	Work out				
		(a) 6^2		(b) 3^3		
		$6^2 = 6 \times 6 = \dots \dots$	ark)	$3^3 = 3 \times 3$	× 3 =	(1 mark)
		(c) $\sqrt{36}$		(d) $\sqrt{144}$		
		Work out which number squared is equal to 3	86.			
		(1 ma	ark)			(1 mark)
		(e) $\sqrt[3]{27}$		(f) $\sqrt[3]{64}$		
		Work out which number cubed is equal to 27.				
		(1 ma	urk)			(1 mark)
		(g) $\sqrt[3]{125}$		(h) $\sqrt[3]{-8}$		
				Work out which nu $- x - x - = -$ you ca	umber cubed is 8, ar an then insert a mir	nd because nus sign.
			ark)			(1 mark)
		(i) $\sqrt[3]{-27}$,			(
		(1) \ 27				
						(1 mark)
	2	Work out the value of $4^2 - (2^2) - (3^2)$.	Square th	e numbers first,	You will need to use problem-solving sk	
PROBLEM		$(4 \times 4) - (2 \times 2) - (3 \times 3)$	addition a	and subtraction.	throughout your ex	am
SOLVED!		– –	=		be prepared.	
						(1 mark)
	3	Look at the following numbers: 2, 4, 8, 9, 2	9, 27, 49	9, 64. Write down	a number that	
Cui ed		(a) is 1 less than a square number.		(b) is 2 more than	n a cube number.	
<u> </u>		(1 ma	ark)			(1 mark)
		(c) has a cube root of 4.				
						(1 mark)
PROBLEM SOLVED!	4	If you add together four consecutive square always be an even number. Explain why you false statement.	e numbe u think 1	ers, the answer will this is either a true	l e or number? an odd nu	pens when re an even How about imber?
						(2 marks)

NUMBER

Indices

	1	Write as single powers of 5			
		(a) $5 \times 5 \times 5$	(b) $5 \times 5 \times 5$	$\times 5 \times 5 \times 5$
		5 (1 mark)	5	(1 mark)
	2	Simplify the expressions, leaving answe	ers in index fo	orm.	When multiplying with indices
		(a) $3^3 \times 3^4$	(b) $4^5 \times 4^3$	you add the indices together.
		$3 \times 3 = 3$	3 ³⁺⁴	$= 4^{5+3}$	
			1 mark)		(1 mark)
		(c) $5^2 \times 5^7$	((d) $3^5 \div 3^2$	When dividing numbers with indices you subtract the indices.
		(1 mark) .		(1 mark)
		(e) $7^8 \div 7^2$	(f) $a^5 \div a^2$	
		7 (1 mark)		(1 mark)
	3	Write as a single power of 4			
		(a) $\frac{1}{4}$	(b) $\frac{1}{4 \times 4 \times 4}$	
		$\frac{4^{1}}{4^{2}} \frac{\cancel{4}}{\cancel{4} \times 4} = \frac{1}{4} = 4^{1-2} = 4^{-1}$	$4^{-1} = \frac{1}{4}$		
		(1 mark)		(1 mark)
	4	Simplify these expressions and leave yo	our answers ir	n index form.	
Gu ⁷ , ed		(a) $\frac{2^3 \times 2^3}{2^4}$	((b) $\frac{5^7}{5 \times 5^3}$	
			marks)		(2 marks)
		(c) $\frac{8^4 \times 8^3}{8^4 \times 8^3}$,	(d) $\frac{3^{-2} \times 3^5}{3^{-2} \times 3^5}$	
		$8^2 \times 8$		$3^4 \times 3^{-7}$	
			(marks)		(2 marks)
	5	Rewrite the following expressions with	out indices.		Any number to the power 0 (except zero
Gu [‡] . ed		(a) $33^0 = \dots$	(b) $25^{-1} =$	itself) is equal to 1.
		(1 mark)		(1 mark)
		(c) $\left(\frac{1}{2}\right)^3 = \frac{1^3}{2^3} = \dots$	($d) \left(\frac{2}{3}\right)^{-3} = \left($	$\left(\frac{3}{2}\right)^3 = \dots$
		(1 mark)		(1 mark)
	6	Work out the value of <i>n</i> .			You will need to use
Gu ² , ed		$3^5 \times 3^3 = \frac{3^{20}}{3^n \times 3^9}$			problem-solving skills throughout your exam - be prepared!
PROBLEM SOLVED!					(2 marks)

(2 marks)

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(1 mark)





(b) the LCM of 12 and 22

throughout your exam – **be prepared!**



£.....

SOLVED!

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Operations on fractions



(2 marks)



..... km

..... miles

6

Guiled

ROBLE SOLVED The distance between Portston and Chidhook is $18\frac{2}{5}$ miles.

The distance between Brigville and Dimchester is $3\frac{1}{4}$ times that

distance. What is the distance between Brigville and Dimchester?

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(3 marks)



(3 marks)

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Calculator and number skills



Standard form 1

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	1	(a) Write 3500 in standard form.			
		$3500 = 3.5 \times 1000 = 3.5 \times 1000$)		(1 mark)
		(b) Write 1.21×10^{-2} as an ordinary num	nber. T	The index is -2, therefore the figures will nove two places to the right (making	(1 mark)
			t	he number 100 times smaller).	(1 mark)
		(c) Write 0.32×10^4 as an ordinary nur	nber.		
					(1 mark)
	2	Write the following numbers in standard	d form.		
Cui od		(a) 600		(b) 570	
Guieu			mark)		(1 mark)
		(c) 4003		(d) 51.1	
			mark)		(1 mark)
		(e) 61.13			
					(1 mark)
	3	Write the following in standard form.	Rewri	te each number so that it lies between	
		(a) 0.35	1 and	10. Now decide the power of 10 that	
		= 3.5 × 10	origin	al value.	(1 mark)
		(b) 0.00182		(c) 0.487×10^5	
		$0.00182 = 1.82 \times 10^{\dots}$ (1	mark)		(1 mark)
	4	(a) Write 5842000 in standard form.			
		5842000 = 5.842 × 10			(1 mark)
		Use the following information $x = 5.842$	2 000, y =	$= 3.16 \times 10^3.$	
		(b) Work out $x + y$, giving your answer standard form to 3 significant figure	' in es.	Convert y into an ordinary number, work out $x + y$ and then convert the result to standard form.	
					(2 marks)
		(c) Work out $x - y$, giving your answer	in stand	lard form to 3 significant figures.	
					(2 marks)
	5	Voyager 2 took 4 years (approximately 3	3.5×10^4	hours) to get	
	5	from Earth to Saturn. The distance betw approximately 7.46 \times 10 ⁸ miles. Work of speed of Voyager 2's journey to 3 signifi	veen the ut the ap cant figu	two planets is problem-solving skil throughout your exa tres be prepared!	ls m
SOLVED!				speed = $\frac{\text{distance}}{\text{time}}$	

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Standard form 2



Counting strategies

- 1 Majid has three letters printed on cards P, Q and R. He also has another three cards
- with the numbers 2, 4 and 6 printed. Find all the ways he can pair a letter with a number.

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Nearly there

Remember that it does not matter which order they appear.

(P, 2), (P, ...), (..., 6), (Q, ...), (..., ...), (..., ...), (..., ...), (..., ...), (..., ...)

2 Millie wants to buy a new bicycle. She can choose a touring bike, a mountain bike or a fold-up bike. Her colour choices are orange, jade or silver. List all her possible choices of bicycle.

	Touring (T)	Mountain (M)	Fold-up (F)
Orange (O)			
Jade (J)			
Silver (S)			

(2 marks)

NUMBER

(2 marks)

3 There are 4 coins on the table: 10p, 20p, 50p and £1. List all the different sums that can be made with any 2 different coins.

	10p	20p	50p	£1
£1				
50p				
20p				
10p				

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4 Three cards each have a different digit on them, 4, 5 and 6. Write down all the six numbers you can make with these cards.

Start with the first card: how many ways can that be the first digit?

(2 marks)

(2 marks)

Five musical instruments, guitar, piano, trumpet, flute and mandolin, are to be recorded on a CD but there will only be two instruments on each track. Each instrument will be recorded with each of the others. How many tracks will be on the CD?



(3 marks)



Use the first letter

of the bicycle and

the colour choices.

Nailed it!



Had a go

(P)(2)

 $(\mathbb{Q})(4)$ (R)(G)

(. .



Copyrighted Material Nearly there \square Nailed it! \square Had a go NUMBER **Problem-solving practice 1** 1 It is said that every even number is the sum of two prime numbers. Find two prime numbers that sum to the following even numbers. (a) 8 (b) 12+ (1 mark) (1 mark) (c) 20 (d) 36 + (1 mark) (1 mark) 16 GB flash drives cost £5.99 and 32 GB flash drives cost £6.88. How much change would you get from £50 if you bought three 16 GB and four 32 GB flash drives? (3 marks) 3 A hot chocolate costs $\pounds 2.70$. A group of friends give the barista $\pounds 25$ to pay for their hot chocolates. What is the maximum number of people there could be in the group, and how much change would there be for that number of hot chocolates? (2 marks) A hotel buys packets of biscuits which each contain 14 biscuits. The hotel is running a conference and plans to provide each person at the conference with 3 biscuits during their coffee break. There are 800 people booked for the conference. How many packets of biscuits will the hotel need to buy? (3 marks) **5** Which fraction is larger: $\frac{3}{5}$ or $\frac{5}{7}$? Show your working. $\frac{3}{5} = \frac{3 \times \dots}{5 \times \dots}$ $\frac{5}{7} = \frac{5 \times \dots}{7 \times}$ (2 marks) Ice cream cornets are produced at a rate of 200 every hour. The factory producing

them operates for $6\frac{1}{2}$ hours per day, 5 days each week. There are 8 ice cream cornets

packed in a box. How many boxes are needed each week?

NUMBER

Problem-solving practice 2 7 In a triangle, angle $A = \frac{1}{2}$ of the total of all the angles, and angle $B = \frac{1}{6}$ of the total of all the angles. (a) What fraction of all angles in the triangle is angle C? (2 marks) (b) What is the size of angle C? (2 marks) Misha buys an 8 kg bag of flour to make pizzas. Each pizza uses 300 g of flour. She sells the pizzas in her restaurant for $\pounds 8.50$ each. (a) How many pizzas can she make? (3 marks) (b) How much money does she make if she sells them all? (2 marks) Deepak has three planks of wood left over from a maintenance job in his house. One piece is 85 cm long, one is 79 cm and the other is 83 cm long. He now needs to cut 7 pieces from what is left, all of the same length for the last part of the job. What is the maximum size for each piece? (4 marks) 10 Two cyclists, Anne and Margaret, are riding on a velodrome. They start together. It takes Anne 30 seconds to complete one circuit. It takes Margaret 40 seconds to complete a circuit. How many circuits will they each have completed when they are both together at the starting point again? Anne (3 marks) Margaret..... 11 A train is travelling at a constant velocity of 112 km/h. Write this velocity as m/s (metres per second). (5 marks) **12** What is the value of *n* in the following equation? $5^n \times 5^{3n} = \frac{5^5 \times 5^4}{5^3}$ (4 marks)