

## REVISE EDEXCEL GCSE (9–1) Mathematics

### Higher



### Series Consultant: Harry Smith

Author: Fiona Harris and Eleanor Jones

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**Practice papers** 

A small bit of small print

Edexcel publishes Sample

Assessment Material and the

Specification on its website. This is

should be used in conjunction with

it. The questions in this book have

revision. Remember: the real exam

questions may not look like this.

been written to help you practise

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Had a go Nearly there

NUMBER





- 1 Here is a list of numbers:
  - 2 4 5 8 10 12 21

From this list, write down

- (a) a square number ..... (1 mark)
- (c) a multiple of 6 ..... (1 mark)
- (b) a prime number ..... (1 mark)
- (d) a factor of 15 ..... (1 mark)

Product means 'times'.

**2** (a) Write 90 as a product of its prime factors.



Use a factor tree. Circle factors when they are prime – these are at the end of the branches.

(2 marks)

(b) Write 120 as a product of its prime factors.

120 = ..... (2 marks)



(3 marks)

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## **Indices** 1

	1	Wr	ite as a single power of 3				
		(a)	$3 \times 3 \times 3 \times 3 =$	How many times is 3 multiplied by itself? This gives you the index.	(b)	$\left(\frac{1}{27}\right)^{-\frac{1}{3}}$ $=\frac{1}{3\cdots}=3\cdots\cdots\cdots$ $d$	emember, $\frac{1}{a} = a^{-1}$ . /hat power of 3 o you have in the enominator?
		(c)	$\sqrt[4]{3^8} = \frac{3\cdots}{3\cdots} = 3\cdots = \cdots =$	First write as a fraction, then subtract indices.	(d)	$  \frac{\sqrt[4]{3}}{\sqrt[3]{3}} = \left(2^{\frac{3}{2}}\right) \left(2^{\frac{3}{2}}\right) $	
						(3) (3)	
	2	(a)	Simplify				
			(i) $x^3 \times x^5 = x^{3+5} = x \cdots$	(1 mark)		(ii) $x^2 \times x^7 = x \cdots$	(1 mark)
		(b)	Simplify				
			(i) $x^7 \div x^3 = x^{7-3} = x \cdots$	(1 mark)		(ii) $x^8 \div x^2 = x \cdots$	(1 mark)
		(c)	Simplify				
			(i) $(x^2)^4 = x^{2 \times 4} = x^{\cdots}$	(1 mark)		(ii) $(x^3)^5 = x \cdots$	(1 mark)
	3	(a)	Simplify $(2x^3)^4$		(b)	Simplify $(3x^5)^3$	
			$= 2^4 \times (x^3)^4$	Simplify numbers first, then letters.		=	(2 marks)
			= × <i>x</i> ····	(2 marks)			
	4	(a)	Simplify $\frac{12 p^4 q^5}{3p^2 q^4}$		(b)	Simplify $\frac{3a^3b^7}{15ab^6}$	
			$=\frac{12}{3} \times \frac{p^{4}}{p^{2}} \times \frac{q^{5}}{q^{4}}$	$q^1$ is $q$		= <u></u> a b	
			= p <sup></sup> q	(2 marks)			(2 marks)
	5	If <u></u>	$\frac{a^{10} \times a^k}{a^5} = a^7, \text{ find } k.$			You will need to use	
<b>Gu</b> <sup>2</sup> . ed						throughout your exam - be prepared!	مې
PROBLEM SOLVED!						k =	(2 marks)
	6	Sin	nplify				
		(a)	$2x^2y^3 \times 3xy^4$		(b)	$3a^4b^2 \times 5ab^3$	
			$= 2 \times 3 \times x^2 \times x \times y^3$	$^3 \times y^4$		=	
			= x <sup></sup> y <sup></sup>	(2 marks)			(2 marks)

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	5	(a)	Work out $\frac{(7.5 - 1.2)^3}{\sqrt{53.2}}$ giving all the digits on your calculator.	 (2 marks)
$\geq$		(b)	Give your answer to 2 decimal places.	 (1 mark)
		(c)	Give your answer to 3 significant figures.	 (1 mark)
	6	(a)	Work out $\frac{\sqrt[3]{12.167}}{(3.9 + 1.2)^2}$ giving all the digits on your calculator.	 (2 marks)
>		(b)	Give your answer to 2 decimal places.	 (1 mark)
_		(c)	Give your answer to 3 significant figures.	 (1 mark)

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### **Fractions**



..... (3 marks)

----)

## Decimals

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..... (2 marks)





..... (2 marks)

ROBLE

SOLVED





The bill at a restaurant for a meal for 4 people was £88.74. Estimate how much each persion should pay.

..... (2 marks)

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## **Standard form**

Nailed it!



..... (3 marks)

## **Recurring decimals**

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## **Upper and lower bounds**

	1	A bag of potatoes weighs 10 kg to the nearest kg.						
		(a) What is the minimum possible weight (lower bound weight) of the bag?						
		$10 - 0.5 = 9.5 \mathrm{kg}$	9.5 r	ounds up to 10 kg.	(1 mark)			
		(b) What is the maximum possible weight (upper bound of the bag?	d weight)					
		$10 + 0.5 = \dots kg$			(1 mark)			
		(c) What is the maximum possible weight of 4 bags?						
	2	Upper bound $\times 4 = \dots \times 4 = \dots + kg$ The height of a person measures 176.3 cm, correct to 1 d	decimal pla	ce.	(1 mark)			
		(a) What is the upper bound of the height? (b) What is the lower bound of the height?						
		$176.3 + 0.05 = \dots$ (1 mark) 17	6.3 –	=	(1 mark)			
	3	The length of a rectangle is 152 mm and the width is 10.7 mm, correct to 3 significant figures. (a) Find the lower and upper bounds of the rectangle's length and width.						
		Upper bound of length = $152 + 0.5 = \dots$ Upper bound of width = $10.7 + \dots = \dots$						
		Lower bound of length = $152 - \dots = \dots$ Lower bound of width = $10.7 - 0.05 = \dots$						
		(b) Calculate the maximum perimeter of the rectangle.	Add toget bounds of	her the upper each of the sides.	(4 marks)			
PROBLEM	4	The formula for the speed ( <i>S</i> ) of a car is given by $S = \frac{D}{T}$ where <i>D</i> is the distance travelled in km and <i>T</i> is the time	e taken.	You will need to use problem-solving skills throughout your exam	(2 marks)			
SOLVED!		D = 142 km correct to 3 significant figures. T = 2.4 hours correct to 1 decimal place.		- be prepared!				
		By considering bounds, what is the minimum speed in k Round your final answer to 1 decimal place.	m/h of the	car?				
		Lower bound of distance =	divide the lo	ower bound of the distant	ce by the			
		Upper bound of time =	upper boun gives you th	d of the time. This combination e smallest possible answer.				
		$\frac{\text{Lower bound of distance}}{\text{Upper bound of time}} = \dots = \dots = \dots \text{ km/h (1 d.p.)}$			(3 marks)			
	5	$x = a^2 - b$		You will need to use				
Gu <sup>2</sup> . ed		a = 20.3 correct to 1 decimal place.		throughout your exam				
DPORIEM		b = 15 correct to 2 significant figures.		– be prepared!				
SOLVED!		Calculate the upper bound of $x$ . Round your final answe	er to 3 signi	ificant figures.				

..... (4 marks)

## **Accuracy and error**

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	1	The length of a piece of string is measured to be 12.3 cm, correct to 1 decimal place.				
•		(a) What are the upper and lower bounds of the length?				
		Upper bound = $12.3 + 0.05 = \dots$				
		Lower bound = =	(2 marks)			
		(b) Complete this inequality	This inequality is not 'equal to'			
		$\dots \leq $ length of string $< \dots$	be is actually 12.34999 (1 mark)			
	2	The circumference of a circle is 35 mm, rounded to	the nearest 5 mm.			
		(a) Find the upper and lower bounds of the diameter of this circle.	Circumference = $\pi \times$ diameter			
		Upper bound of diameter = $\frac{\dots}{\pi}$ =				
		Lower bound = $\frac{32.5}{\pi}$ =	(3 marks)			
		(b) Complete the inequality				
		≤ diameter <	(1 mark)			
	<ul> <li>3 The acceleration of an object is 10 m/s<sup>2</sup>, correct to the nearest integer, and its mass is 50.5 kg, correct to 1 decimal place.</li> </ul>					
	(a) Calculate the upper and lower bounds of the object's force. Force = mass $\times$ acceler					
		Upper bound = $\dots \times 10.5 = \dots$				
		Lower bound = $50.45 \times \dots = \dots$	(2 marks)			
		(b) Hence, or otherwise, calculate the force to a suitable degree of accuracy.	To how many significant figures do you need to round the upper			
		Answer = 500 N ( s.f.)	and lower bounds so that you get the same values? (2 marks)			
Guiled	4	A lift can carry 750 kg measured to 2 significant figures in the lift is 70 kg measured to the nearest 10 kg. What is the greatest number of people that can be s	ares. The average weight of a person afely carried in the lift?			
			(3 marks)			
Guiled PROBLEM SOLVED	5	A package in the shape of a cube, weighing 948 g, cu 3 significant figures, is put on a table. It has side len 0.3 m, rounded to the nearest cm. Pressure (pa) is given by the formula $P = \frac{F}{A}$ where <i>F</i> is measured in N and <i>A</i> in m <sup>2</sup>	orrect to gth You will need to use problem-solving skills throughout your exam - be prepared!			
JOINED.		(a) Find the maximum and minimum pressure the	package exerts on the table.			

(3 marks)

(b) Write down the value of P to a suitable degree of accuracy.

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### Surds 1

Nailed it!



# **Counting strategies**

Nailed it!

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Had a go





..... (2 marks)

## **Problem-solving practice 1**



Write 4 and 8 as powers of 2.  $(2^{a})^{b} = 2^{ab}$  $2^a \times 2^b = 2^{a+b}$ 

(4 marks)

(2 marks)

(2 marks)



Two toy cars are started from the same point on a circular track at different speeds. Car A and car B take 24 and 40 seconds, respectively, to complete the track. After how long will the cars next pass the start point at the same time?

Find the HCF of 24 and 40.

(2 marks) . . . . . . . . . . . . .



There are 500 pupils in a school. They travel there by car, bicycle or by walking.  $\frac{1}{4}$  of the children cycle to school.  $\frac{2}{5}$  of those who cycle are girls. The number of girls coming to school by car is twice the number who cycle. 175 children walk, of those 60 are boys. How many boys come to school by car?

It may help to draw a 2-way table

$$\frac{1}{4}$$
 of 500 = 125  
 $\frac{2}{5}$  of 125 = .....

fill in the table

5 07 125 Each part of the question helps you to

	Bicycle	Car	Walk	Total
Girls				
Boys				
Total	125			500

(4 marks) . . . . . . . . . . . . .

### **Problem-solving practice 2**

Nailed it!

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5 A lawn, in the shape of a parallelogram, has the dimensions shown.

Had a go



(b)  $2\sqrt{3}$ , 12,  $24\sqrt{3}$ , 144, ...., ...

(2 marks)

**ALGEBRA** 

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### **Algebraic expressions**





**ALGEBRA** 





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#### Factorising 1 (a) Factorise 10x + 15What is common to both terms? Bring this out, in front of the brackets. = 5(...x + ...)(1 mark) Then ask, what do I need to multiply this (b) Factorise 6x - 18by to get 10x and then 15? = 6(...x - ...)(1 mark) (c) Factorise $x^2 - 7x$ = x(... - ...)(1 mark) Sometimes it is a letter that is common to both. (d) Factorise $12x^2 + 15x$ = 3x(...x + ...)(1 mark) Sometimes it is a letter and a number! (e) Factorise $9xv - 12x^2$ = .....) (1 mark) (f) Factorise $25y^3 + 20y^2$ = ..... (1 mark) 2 (a) Factorise $x^2 + 7x + 12$ A quadratic factorises into 2 brackets. $= (x + \dots) (x + \dots)$ These numbers need to multiply together to make 12, but add together to make 7. (2 marks) (b) Factorise $x^2 - 6x + 8$ The two numbers need to multiply together to get +8, = (x - ...) (x - ...)but add together to get -6. (Remember $- \times -$ is a + !) (2 marks) (c) Factorise $x^2 - 3x - 10$ Remember to check your answer by multiplying out the brackets to get back to the question. = (x + ...) (x - ...)(2 marks) (d) Factorise $x^2 + 2x - 15$ $= (\dots ) (\dots )$ (2 marks) **3** (a) Factorise $2x^2 + 7x + 3$ The numbers must multiply together to get +3, but also the inside terms added to the outside terms =(2x + ...)(x + ...)(2 marks) must make +7x. (b) Factorise $3x^2 - 2x - 5$ The 2 numbers multiply together to get -5; inside = (3x ...) (x ...)(2 marks) and outside terms add to get -2x. (c) Factorise $5x^2 - 14x - 3$ $= (\dots) (\dots)$ (2 marks) 4 (a) Factorise $x^2 - v^2$ A special case called 'the difference of two squares'. $(x + \dots) (x - \dots)$ (2 marks) (b) Factorise $4x^2 - 9v^2$ The 2 brackets will have the same terms but different signs so that the inside and outside terms cancel out. (2x .....) (2x .....) (2 marks) (c) Factorise $25a^2 - 81$

### 18

 $= (\dots) (\dots)$ 

(2 marks)

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## Linear equations 1

Nailed it!

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Nearly there



(2 marks)

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### **Linear equations 2**



*x* = ...

(2 marks)



(3 marks)