## An Investigation Number 8-1

	Difficult digits	
	Instructions	
	<ul> <li>Work alone</li> <li>Follow the questions carefully All solutions are to be written on this paper.</li> </ul>	
1	List all two-digit numbers that can be made from the digits 2 and 3. Digits can be rep	eated. How many
	are there? This question has already been completed for you.	This question has
		already been
		completed for you.
		<b>0 marks</b> are allocated.
	No. of numbers = 4	
2	List all three-digit numbers that can be made from the digits 5 and 9. Digits can be re	peated. How many
	are there? You will not need all the spaces below.	
	No. of numbers =	For each of questions
3	List all four-digit numbers that can be made from the digits 4 and 7. Digits can be	2, 3 and 4;
	repeated. How many are there? You will not need all the spaces below.	Score the maximum of <b>2 marks</b> if you find all
		the possible answers
		with <u>no</u> <u>errors</u> .
		If you find more than
		half the possible answers and/or make
		mistakes, or your answers demonstrate a
		pattern that could be
		used to find all the possible answers, <b>1</b>
	No. of numbers =	mark.
4	List all two-digit numbers that can be made from the digits 1, 5 and 9. Digits can be	No attempt or
	repeated. How many are there? You will not need all the spaces below.	insufficient attempt, <b>0</b> marks.
	No. of numbers =	

5				-									-			and 9	). Dig	gits	can b	e repeated. How
	many	/ are t	here	e? <b>y</b>	ou	WIII	no	t no	ed (	all ti	ne s	pace	es t	Delo	W.					Score the maximum of
																				<b>3 marks</b> if you find all
																			_	the possible answers
																				with <u>no</u> <u>errors</u> .
																				If you find more than
	-					-									_				_	half the possible answers and/or make
																				mistakes, or your
																				answers demonstrate a
																			_	pattern that could be used to find all the
																				possible answers, 1 or
	Co	mplet	e th	is tal	ble	bv v	vriti	ng h	ow m	anv	digits	s can	beı	used	in e	each	place	<b>e</b> .		2 marks.
		o. of (							. of d				1 1			diffe			its	No attempt or
						0						0						0		insufficient attempt, <b>0</b> marks.
							X						×							marks.
	No.	of nu	mb	ers	=															
6	List a	all thr	ee-c	ligit	nur	nber	s th	at ca	an be	made	e fror	n the	dig	its 2	2, 4,	6 and	d 8. I	Digi	ts car	be repeated. How
	many	/ are t	here	e? <b>Y</b>	ou	will	no	t no	ed (	all ti	he s	pace	es b	oelo	w.					
	Г																			Score the maximum of
																				<b>3 marks</b> if you find all the possible answers
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																				answers and/or make
	-																			mistakes, or your answers demonstrate a
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	No.	of nu	mb	ers	=															1

7 Complete this table by writing how many digits can be used in each place, multiply these numbers to get "Number of different numbers". The general question for these results is "**How many** *n*-digit numbers can be made from *x* different digits?"

	No. of		No. of		No. of				No. of			8 marks if you find a
Question	different digits in ten thousands place	×	different		different digits in hundreds place	×	No. of different digits in tens place	×	No. of different digits in units place	=	No. of different numbers	the possible answers with <u>no errors</u> . That is, you get <b>1</b> <b>mark</b> for each correct answer.
How many different 2-digit numbers can be formed using 2 different digits?		×	×	<		×	2	×	2	-	4	No attempt or insufficient attempt, <b>marks</b> .
How many different 2-digit numbers can be formed using 3 different digits?		×	×	٢		×		×		-		
How many different 2-digit numbers can be formed using 4 different digits?		×	×	٢		×		x		-		
How many different 3-digit numbers can be formed using 2 different digits? How many		×	×	٢		×		×		-		
different 3-digit numbers can be formed using 3 different digits?		×	×	٢		×		×		-		
How many different 3-digit numbers can be formed using 4 different digits?		×	×	٢		×		×		-		
How many different 4-digit numbers can be formed using 2 different digits?		×	×	<		×		×		-		
How many different 4-digit numbers can be formed using 3 different digits?		×	×	٢		×		×		-		
How many different 4-digit numbers can be formed using 4 different digits?		×	×	<		×		×		-		

		Expand	led Form	Ind	ex Form	Score the maximum 9 marks if you find
	a)	3 × 3		3 <sup>2</sup>		the possible answer with <u>no errors</u> .
		$x \times x$				That is, you get <b>1</b> <b>mark</b> for each corr
	c)	$\frac{x + x}{8 \times 8 \times 8}$				answer.
	d)	$2 \times 2 \times$	× 2			No attempt or insufficient attempt <b>marks</b> .
	e)	$\frac{10 \times 10 \times 10 \times 10 \times 10}{10 \times 10 \times 10} \times 10$				marks.
	(c) f)		0	24		
	,			36		
	g) h)			$n^3$		
				p <sup>5</sup>		
	i)			-		
	j)			$(\frac{1}{2})^3$		
Consi How	ider th <b>many</b>	nis table by writing the is question. <i>n</i> -digit numbers can l case follows the same	be made from <i>x</i> diffe	rent digi	ts?	
Consi How	ider th <b>many</b>	is question. <i>n</i> -digit numbers can	be made from <i>x</i> diffe	rent digi	ts?	Score the maximum 4 marks if you find
Consi How This g	ider th <b>many</b> genera	is question. <i>n</i> -digit numbers can l case follows the same Question ny different 3-digit	<b>be made from <i>x</i> diffe</b> e rule as questions with <b>Expanded Form</b>	erent digi n number	ts? s. Index Form	Score the maximum <b>4 marks</b> if you find the possible answer with <u>no errors</u> .
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