

MURDER IN THE MATHEMATICS DEPARTMENT

A MURDER HAS BEEN COMMITTED IN THE MATHS DEPARTMENT AT A NEARBY SCHOOL.

YOUR JOB IS TO DECODE THE CLUES TO FIND

- (A) THE IDENTITY OF THE MURDERER
- (B) THE MURDER WEAPON
- (C) THE ROOM IN WHICH THE MURDER TOOK PLACE

THE SEVEN **SUSPECTS** ARE:

MR BROOME DR FRANCE MR HALAI MISS KAUR
MR SCOTLAND MR SHEPPARD MR SMITH

THE POSSIBLE **MURDER WEAPONS** ARE:

METRE RULER CHAIR SCISSORS
COMPASS TEXTBOOK PENCIL
STAPLER

THE **ROOM** IN WHICH THE MURDER WAS COMMITTED COULD BE:

16 23 24 25 28 29 COMPUTER ROOM

CODE 1: PIGPEN

The first code uses the following **key**. You need to work out how to use the key to decode the message which follows.

A	B	C	J	K	L		
D	E	F	M	N	O		
G	H	I	P	Q	R		

>no fefef fo vnrll
 n >no e<fefef vjv
 lefefef >>of njv j
 fefef e<efef

CODE 2:POLYBIUS SQUARE

5	A	B	C	D	E
4	F	G	H	I	J
3	K	L	M	N	O
2	P	Q	R	S	T
1	U	V	W	X	Y/Z
	1	2	3	4	5

(5,2)(3,4)(5,5) (3,3)(1,1)(3,2)(4,5)(5,5)(3,2)(5,5)(3,2) (4,5)(5,3)(5,5)(4,2)
 (4,3)(5,3)(5,2) (3,4)(1,5)(2,1)(5,5) (1,5)(4,3) (5,5) (4,4)(4,3)
 (5,2)(3,4)(5,5)(4,4)(3,2) (4,3)(1,5)(3,3)(5,5)

CODE 3

There is no key provided for this code. You will have to work out the key for yourself.

20,8,5 13,21,18,4,5,18 23,1,19 14,15,20 9,14 1 16,18,9,13,5
14,21,13,2,5,18,5,4 18,15,15,13

CODE 4



Your only clue for this one is that it was received by mobile phone.

843068733709327660363706680428302074277063825072780

CODE BROKEN:

THE MURDER WEAPON DOES NOT HAVE A SHARP METAL PART

CODE 5: ATBASH

Hint: every letter represents some other letter in a simple system

GSV ILLN MFNYVI RH Z NFOGRKOV LU ULFI

CODE 6: CAESAR CIPHER

You will need a Caesar wheel to crack this one.

KYV DLIUVIVIJ ERDV NZCC KVCC PFL NYRK TFLEKIP YV ZJ WIFD

CODE 7: MORSE CODE

A . - B - . . . C - . - . D - . . E . F . . - . G - - . H I . . J . - - - K - . - L . - . . M - -	N - . O - - - P . - - . Q - - . - R . - . S . . . T - U . . - V . . . - W . - - X - . . - Y - . - - Z - - . .
--	--

- / . - . - - - - - - - /
 - . . . - - - / . - /
 . . . - - - /
 . . - . . - . - . - - - . - . . . /

CODE 8: THE FINAL CHALLENGE

This looks disturbingly familiar, but there's something weird about it...

- . - - . . - . - . / - - . - - . - . . - . / - - . - . - - / - - . -
 - . / - - - . . - / . - . - . - . / - . - - - . . -
 - - . - . - - - - . - - - . . . / . . - . . - . - . - . - - - / - . . .
 - . . - . . . - - . - . - . - - . - . - . - . - - . /
 - . - . - - . - . - - - - . - . / - . . . - . - . - . - -
 - . . - - - . - . - . . . / . - . . . - - - . - - / - . . .
 . - . - . - . / - . . - . - - /

ONE LAST MESSAGE

Use all your cunning to break this final message left by the murderer. You might want to keep a track of which letters represent what using the provided grid.

XNFF OUMN! QUV SEKN TPULNM BSN AUON EMO AEVISB CN. WU TNRUPN

H IU BU GPHWUM H XHFF PNXEPO QUV XHBS E FHBBFN THB UR CQ

LMUXFNAIN ETUVB AUONW. BSNPN EPN CEMQ XEQW BU TPNEL E

CNWW EIN BSEB SEW TNM NMAUONO VWHMI E AHG SNP. SUXNKNP,

BSN TNWB XEQ BU EBBEAL WVAS E CNWW EIN HW VWHMI RPNYVNMAQ

EMEFQWHW. BSHW VWNW BSN REAB BSEB NKNPQ FEMIVEIN SEW

ANPBEHM FNBBNPW BSEB UAAVP CUPN RPNYVNMBFQ BSEM UBSNPW. UR

AUVPWN, MUB NKNPQ GHAN UR BNJB SEW BSN WECN FNBBNP

OHWPHTVBHUM, WU BSN GNPWUM TPNELHMI BSN AUON SEW BU VWN

E ANPBEHM ECUVMB UR HMINMVHBQ EMO GPUTFNC WUFKHMI WLHFFW

BU APEAL BSN AUON. BSHW HW XSQ BSN WAHNM AN UR APQGBUIPEGSQ

HW EM EGGFHNO WVTDNAB UR CEBSNCEBHAW.

Code Letter	A	B	C	D	E	F	G	H	I	J	K	L	M
Real Letter													
Code Letter	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Real Letter													

Code Letter	A	B	C	D	E	F	G	H	I	J	K	L	M
Real Letter													
Code Letter	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Real Letter													

Code Letter	A	B	C	D	E	F	G	H	I	J	K	L	M
Real Letter													
Code Letter	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Real Letter													

Code Letter	A	B	C	D	E	F	G	H	I	J	K	L	M
Real Letter													
Code Letter	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Real Letter													

Code Letter	A	B	C	D	E	F	G	H	I	J	K	L	M
Real Letter													
Code Letter	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Real Letter													

Solutions

Code 1 (Pigpen):

"the room in which the murder was committed has a room number"

Code 2 (Coordinates):

"the murderer does not have an e in their name"

Code 3 (a=1, b=2, c=3 etc):

"the murder was not in a prime numbered room"

Code 4 (mobile phone):

"the murder weapon does not have a sharp metal part"

Code 5 (Atbash):

"the room number is a multiple of four"

Code 6 (Caesar a → r):

"the murderers name will tell you what country he is from"

Code 7 (Morse code)

"the room number has eight factors"

Code 8 (Morse code with Caesar shift a → j)

"but how did he do it perhaps with something that students can sit on"

kdc qxf mrm qn mx rc ynaqjyb frcq bxvncqrwp cqjc bcdmnwcb
ljw brc xw

Mr Scotland, room 24, chair

One Last Message (Substitution, "ETAONRISHDLFCMUGYPWBVKXJQZ")

"Well done! You have broken the code and caught me. So before I go to prison I will reward you with a little bit of my knowledge about codes. There are many ways to break a message that has been encoded using a cipher. However, the best way to attack such a message is using Frequency Analysis. This uses the fact that every language has certain letters that occur more frequently than others. Of course, not every piece of text has the same letter distribution, so the person breaking the code has to use a certain amount of ingenuity and problem solving skills to crack the code. This is why the science of cryptography is an applied subject of mathematics."