

CRIME SCENE INVESTIGATION

A crime has been committed by one of the ten suspects below.

You have been brought in as a police consultant.

You should analyse the evidence provided to eliminate
nine of the suspects.

You will need to be ready to present your findings to the chief
inspector in 50 minutes.

Good Luck!

THE SUSPECTS:



EVIDENCE 1: BLOOD TYPE

The suspect caught their arm on some glass and so you were able to get a sample of their blood, it has been confirmed as Type A. Blood analysis works by looking for antibodies which indicate the blood type.

X antibodies indicate Type A, Y antibodies indicate Type B and Z antibodies indicate Type O.

You need to analyse the lab results to see which antibodies the blood contains, anyone who isn't type A can be eliminated.

Suspect 1: $3x + 2y - 3x$

Suspect 2: $4x - 4x + 7y - 3y + x$

Suspect 3: $4y + 2y + x + 2x$

Suspect 4: $3y - 3y + 4x$

Suspect 5: $7x + 3x - 6x$

Suspect 6: $2x + 2y - 2x$

Suspect 7: $3x + y - 3y$

Suspect 8: $2y + 2z + z + x$

Suspect 9: $-8x - 2x$

Suspect 10: $2x + y - 2z - 2x$



EVIDENCE 2: KEY CODE

The money was stolen from a safe which has a key code. Each suspect was questioned using a lie detector. The final digit of the code is 6, work out their answers and eliminate any suspects who did not know $x = 6$.

Suspect 1: $x + 9 = 15$

Suspect 2: $x - 5 = 1$

Suspect 3: $x + 3 - 9 = 0$

Suspect 4: $2x + 4 = 18$

Suspect 5: $3x - 1 = 17$

Suspect 6: $4x + 10 = 34$

Suspect 7: $5x - 6 = 24$

Suspect 8: $2(x + 1) = 14$

Suspect 9: $3(2x + 1) = 38$

Suspect 10: $x(x + 1) = 42$



EVIDENCE 3: NUMBER PATTERNS

£12 million was stolen in this crime. All the suspects have stolen money in the past and as with most criminals the amounts have followed a pattern. Eliminate any suspects who would not have £12million in their pattern next.

Suspect 1: 6million, 8million, 10million, ...

Suspect 2: 0million, 4million, 8million, ...

Suspect 3: 10.5million, 11million, 11.5million, ...

Suspect 4: 18million, 16million, 14million, ...

Suspect 5: 5million, 7million, 9million, ...

Suspect 6: 24million, 20million, 16million, ...

Suspect 7: 23million, 20million, 17million, ...

Suspect 8: 1.5million, 3million, 6million, ...

Suspect 9: 11.4million, 11.6million, 11.8million, ...

Suspect 10: 96million, 48million, 24million, ...



EVIDENCE 4: BODY MASS INDEX

In order to break through the door the criminal must have had a body mass index of at least 22. This is worked out using the following formula:

$$B = \frac{w}{h^2}$$

B = Body mass Index

w = Weight in kg

h = Height in m

Use the data for each suspect and eliminate anyone who did not have a high enough body mass.

Suspect	Weight kg	Height m	Body Mass Index
1	70	1.60	
2	50	1.55	
3	70	1.75	
4	55	1.45	
5	88	1.82	
6	58	1.84	
7	75	1.66	
8	87	1.75	
9	91	1.85	
10	69	1.72	



EVIDENCE 5: DIGITAL SIGNATURE

The CCTV cameras were hacked during the crime and turned off. The police were able to trace the digital signature of the computer which they worked out to be $12x + 32y$. Each of the suspects laptops were confiscated by police and their signatures were checked. The results are below.

Suspect 1: $6(2x + 4y)$

Suspect 2: $4(3x + 4y)$

Suspect 3: $6(3x + 4y)$

Suspect 4: $4(2x + 8y)$

Suspect 5: $4(3x + 9y)$

Suspect 6: $8(2x + 4y)$

Suspect 7: $3(4x + 10y)$

Suspect 8: $2(6x + 16y)$

Suspect 9: $12(x + 3y)$

Suspect 10: $2(6x + 19y)$



