

① a) $I^B I^B$ b) $I^A I^B$ c) ii

② child $I^A I^A$ or $I^A i$

possibilities

$I^A I^A \times I^A I^A$, $I^A I^B \times I^A I^A$, $I^B i \times I^A I^A$
 $I^A I^A \times I^A i$, $I^A I^B \times I^A i$, $I^B i \times I^A i$

* neither parent can be $I^B I^B$ (homozygous)

③ $ii \times I^A I^B$

o could ♀ AB produce AB child?
yes! if ♂ AB or ♂ B or ♂ A
(hetero or homo)

	I^A	I^B
i	$I^A i$ A-type	$I^B i$ B-type

o could ♀ AB produce O child?
nope!

④ $I^A i \times I^B i$

must \neq be heterozygous because of ii mothers.

F_1 gam

	I^A	i
I^B	$I^A I^B$	$I^B i$
i	$I^A i$	ii

one of each:
 $AB : A : B : O$

⑤ $I^A I^B \times I^B i$

↑
mother has A-type.
∴ can't be homozygous I^B

F₁ gen

	I^A	I^B
I^B	$I^A I^B$	$I^B I^B$
i	$I^A i$	$I^B i$

Genotype 1:1:1:1
AB BB Ai Bi

Phenotype 1:2:1
AB B A

⑥ a) His justification $A \times B \Rightarrow A, B$ or AB
he didn't consider being heterozygous $I^A i$
and his wife being heterozygous $I^B i$

b) Nope. His heterozygosity $I^A i$ could extend
to being a carrier for Rh^- as well.

c) Yep. This means his blood type is homozygous
 $I^A I^A$. The child can't be his.

d) She did have an affair. She is homozygous
 $I^B I^B$. The legitimate child can only be $I^A I^B$

⑦ wife ii $I^M I^N$

husband ii $I^M I^N$

F₁ children ii $1 I^M I^M : 2 I^M I^N : 1 I^N I^N$

∴ 1st and 2nd child are possible
but not 3rd child.

wife ii $I^M I^N$

Mr. Y $I^A i$ $I^N I^N$ or $I^N i$

or

$I^A I^A$

F₁ children $I^A i$ or ii $1 I^M I^N : 1 I^N I^N$
 $1 I^M i : 1 I^N i$

∴ All 3 children are possible

Given the eight years the wife and husband
tried and did not succeed at having a child,
it would be a safe assumption that Mr. Y
fathered all three children.

⑧ Peach family → Jennifer

$ii \times ii \rightarrow ii$

Hartzel family → Rebecca

$ii \times \begin{matrix} I^A I^A \\ a \\ I^A i \end{matrix} \rightarrow I^A i$

Simon family → Holly

$I^A I^B \times I^A I^B \rightarrow I^B I^B$