Churchill wins: $\{(\text{Atlee}, 0), (\text{Churchill}, 10^6)\}$
all of the votes

Churchill wins by one vote
$\{(\text{Atlee}, 499999), (\text{Churchill}, 500001)\}$

set of All possible outcomes:
$\{\{(\text{Atlee}, n), (\text{Churchill}, 10^6 - n)\}$
s.t. $n \in \mathbb{N}$ and $0 \leq n \leq 10^6\}$

B13 (i) Negate: for all $x>0$, $\sqrt{x} > 0$.

Answer: there exist some $x > 0$ such that $\sqrt{x} \leq 0$.

Axiomatic approach:

de Morgan laws:

for all $x>0$, $\sqrt{x} > 0$
is the same thing as
it is false that
there exists some $x > 0$
such that it is false that
$\sqrt{x} > 0$.

Or he might have written
$\forall x > 0$, $\sqrt{x} > 0$
is the same as
$\underbrace{\neg \exists x > 0}_{\text{it never happens that}} \quad \underbrace{\neg \sqrt{x} > 0}_{\text{something went wrong}}$

Therefore, the negation of these statements is
$\underbrace{\neg\neg}_{\text{double negation cancels out}} \exists x > 0 \quad \neg \sqrt{x} > 0.$

which is the same as
$\exists x > 0 \quad \neg \sqrt{x} > 0$

and
$\exists x > 0 \quad \sqrt{x} \leq 0.$

(iii) Negate: All punishments fit the crime.

Reformulate: For all crimes c, the punishment for that crime $p(c)$ fits the crime c.

Negation: there exists a crime c such that the punishment $p(c)$ does not fit the crime c.

Axiomatic/formal approach:

reformulate:
$\forall c, \ p(c)$ fits c.
$\iff \neg \exists c \ \neg p(c)$ fits c

negation: $\neg\neg \exists c \ \neg p(c)$ fits c
$\iff \exists c \ \neg p(c)$ fits c

From the audience.

I defined a set

$$X = \{ f : [0,1] \to [0,1] \}.$$

X is the set of functions whose domains are $[0,1]$, and whose co-domains are $[0,1]$.

$g(x) = x^2$ where $\text{dom}(g) = [0,1]$
$\text{co-dom}(g) = [0,1]$

Yes, $g \in X$

$h(x) = x^2$ where $\text{dom}(h) = \mathbb{R}$
$\text{co-dom}(h) = \mathbb{R}$.

No, $h \notin X$.