

HW10

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1

Someone who lives in Dreadbury Mansion killed Aunt Agatha
 $\exists x (inMansion(x) \wedge killedAgatha(x))$

2

Agatha, the butler, and Charles live in Dreadbury Mansion, and are the only people who live therein.

$\forall x (isAgatha(x) \vee isButler(x) \vee isCharles(x)) \implies inMansion(x)$

3

A killer always hates his victim, and is never richer than his victim
 $\forall x killedAgatha(x) \implies (hates(x, Agatha) \wedge richerThan(Agatha, x))$

4

Charles hates no one that Aunt Agatha hates

$\forall x \forall y \forall z (isAgatha(x) \wedge hates(x, y) \wedge isCharles(z) \implies \neg hates(z, y))$

5

Agatha hates everyone except the butler.

$\forall x \forall y (isAgatha(x) \wedge \neg isButler(y) \implies hates(x, y))$

6

The butler hates everyone not richer than Aunt Agatha

7

The butler hates everyone Aunt Agatha hates

$$\forall_x \forall_y \forall_z (isAgatha(x) \wedge hates(x, y) \wedge isButler(z) \implies hates(z, y))$$

8

No one hates everyone

$$\nexists x \forall y hates(x, y)$$

9

Agatha is not the butler

$$isAgatha(x) \implies \neg isButler(x)$$