

October 2019

1. Someone who lives in Dreadbury Mansion killed Aunt Agatha.

$$\exists_x(lives_in_mansion(x) \cap killer(x))$$

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

$$\forall_x(lives_in_mansion(x) \rightarrow (x = a \cup x = b \cup x = c))$$

3. A killer always hates his victim, and is never richer than his victim.

$$\forall_x \forall_y((killer(x) \cap victim(y)) \rightarrow richer_than(y, x))$$

4. Charles hates no one that Aunt Agatha hates.

$$\forall_x(hates(a, x) \rightarrow \neg hates(c, x))$$

5. Agatha hates everyone except the butler.

$$\forall_x(x \neq b \rightarrow hates(a, x))$$

6. The butler hates everyone not richer than Aunt Agatha.

$$\forall_x(\neg richer_than(a, x) \rightarrow hates(b, x))$$

7. The butler hates everyone Aunt Agatha hates.

$$\forall_x(hates(a, x) \rightarrow hates(b, x))$$

8. No one hates everyone.

$$\forall_x \exists_y(\neg hates(x, y))$$

9. Agatha is not the butler.

$$a \neq b$$