Formalize each of the following statements as a binary expression.

(a) Everybody loves somebody sometime.
\[ \forall p: \text{people} \cdot \exists q: \text{people} \cdot \exists t: \text{time} \cdot (p \text{ loves } q \text{ at time } t) \]

(b) Every 10 minutes someone in New York City gets mugged.
\[ \forall t: \text{(10 minute intervals)} \cdot \exists p: \text{(people of New York City)} \cdot (p \text{ gets mugged at time } t) \]
More likely the speaker is saying
(a long time in minutes)
\[ / \text{ (the number of people in New York City who get mugged during that time)} = 10 \text{ approximately} \]

(c) Every 10 minutes someone keeps trying to reach you.
\[ \exists p: \text{people} \cdot \forall t: \text{(10 minute intervals)} \cdot (p \text{ tries to reach you at time } t) \]

(d) Whenever the altitude is below 1000 feet, the landing gear must be down.
\[ \forall a: \text{real} \cdot a < 1000 \Rightarrow \text{(gear down)} \]

(e) I'll see you on Tuesday, if not before.
\[ \text{Let } s \text{ be a predicate of time, so that } s \ t \text{ means I'll see you at time } t \ . \text{ If the given statement means I'll see you on Tuesday regardless of whether I see you before, then } s \text{ Tuesday} \]
But if it means I'll see you sometime between now and then,
\[ \exists t: \text{now} < t \leq \text{Tuesday} \land s \ t \]

(f) No news is good news.
\[ \text{I guess news is a text of a binary expression, with “T” being good news and “⊥” being bad news. And I suppose } \text{paper} \text{ is a bunch of texts, and that's the source of news. So maybe} \]
\[ “\neg \exists \text{news: paper} \cdot \text{T”: paper} \]

(g) “I don't agree with anything you say.”
\[ \text{Introduce prefix operators } \text{Iagreewith} \text{ and } \text{Yousay} . \]
\[ \forall x: \neg (\text{Iagreewith } x) \iff (\text{Yousay } x) \]

(h) “I don't agree with everything you say.”
\[ \text{Introduce prefix operators } \text{Iagreewith} \text{ and } \text{Yousay} . \text{ It seems to me there are two possible interpretations for the sentence. One is the same as part (a).} \]
\[ \forall x: \neg (\text{Iagreewith } x) \iff (\text{Yousay } x) \]
The other is
\[ \neg \forall x: (\text{Iagreewith } x) \iff (\text{Yousay } x) \]
They are not equivalent. To decide between them requires more context.