10.1

a. $K(a) \wedge W(m)$.

b. $K(a) \Rightarrow Q(g)$.

c. $K(a) \wedge P(a, e)$.

d. $\neg A(m, l)$.

e. $L(l, g) \vee L(g, l)$ (or $L(l, g) \vee_e L(g, l)$ if the sentence didn't intend that they could both love each other).

f. $W(m) \wedge A(m, a)$.

10.2

a. $\forall x D(x) \Rightarrow H(l, x)$.

b. $\forall x D(x) \Rightarrow N(d, l)$.

c. $\exists x \forall y (D(x) \wedge N(x, y))$.

d. $\exists x S(x, h)$.

e. First, "maidens" is not defined. So let $M(x) = x$ is a maiden. Second, this one is ambiguous: $\forall x (D(x) \Rightarrow \forall y (M(y) \Rightarrow \neg K(x, y)))$ (every dragon was unkeen on maidens) vs. $\neg \forall x (D(x) \Rightarrow \forall y (M(y) \Rightarrow K(x, y)))$ (not every dragon was keen on maidens).

f. $\forall x ((D(x) \wedge \forall y (M(x) \Rightarrow K(x, y))) \Rightarrow N(x, l))$.

g. $\neg \forall x S(x, h)$.

h. $\neg \exists x D(x, l)$.

10.3

Though it's not technically correct, for the sake of conciseness I will substitute the constant symbols l, g, e, i, d for their denotations in my explanations.

a. *true*, because $\langle g, i\rangle \in F(L)$.

b. *false*, because $\langle d, l\rangle \notin F(C)$.

c. *false*, because $M(e)$ but $\neg L(e, g)$.

d. *true*, because $M(i)$ and $L(i, g)$.

e. *true*, because $S(l, d)$ and there was no knight that loved Elaine.

f. *true*, because Lancelot slew every dragon and freed every maiden (in the model, of course).

10.4

I'll use $\models$ to indicate reduction steps.

a. $F(l, e) \vee F(l, i) \models T \vee T \models T$.

b. $F(l, e) \vee_e F(l, i) \models T \vee_e T \models F$.

c. $S(l, d) \Rightarrow F(l, e) \models T \Rightarrow T \models T$.

d. $L(g, i) \Rightarrow F(g, i) \models F \Rightarrow F \models T$.

10.5

(sweater/jumper) I don't know what a jumper is, but according to WordNet, sweater and jumper are taxonomic sisters under garment: $\forall x(Sweater(x) \Rightarrow Garment(x)) \wedge \forall x(Jumper(x) \Rightarrow Garment(x))$.

(true/false) $\forall x(True(x) \Rightarrow \neg False(x))$ (not a negated equivalence or an exclusive or on the account that certain things (eg. a banana) are neither true nor false).

(gun/weapon) $\forall x(Gun(x) \Rightarrow Weapon(x))$.

(open/shut) $\forall x(Door(x) \Rightarrow (Open(x) \vee_e Shut(x)))$ (this might seem a little strange, but I am being more specific in saying that not only can a door not be open and shut simultaneously, but that it has to be one or the other).

(uppercut/punch) $\forall x(Uppercut(x) \Rightarrow Punch(x))$.

(car/automobile) $\forall x(Car(x) \Rightarrow Automobile(x))$.