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CS 225

Asn **1.3** (7th edition book) section 1.4: #6, 8, 10, 12, 16, 24

6.   a) There is a student in my school that has visited North Dakota

        b) All students in my school as visited North Dakota

        c) There is not at least one student in my school that has visited North Dakota

        d) There is at least one student in my school that has not visited North Dakota

        e) Not all students in my school as visited North Dakota

        f) All students in my school has never visited North Dakota

8)   a) If an animal is a rabbit, then it hops

        b) All animals are rabbits and can hop

        c) there exists an animal where if it's a rabbit, then it hops

        d) There exists an animal that is a rabbit and it hops.

10.   a) $\exists x(C(x) \wedge D(x) \wedge F(x))$

        b) $\forall x(C(x) \wedge D(x) \wedge F(x))$

        c) $\exists x(C(x) \wedge \neg D(x) \wedge F(x))$

        d) $\neg \forall x(C(x) \wedge D(x) \wedge F(x))$

        e) $\exists x C(x) \wedge \exists x D(x) \wedge \exists x F(x)$

12.   a) Q(0) is true

       b) Q(-1) is true

       c) Q(1) is false

       d) ∃xQ(x) is true

       e) ∀xQ(x) is false

       f) ∃x¬Q(x) is true

       g) ∀x¬Q(x) is false

16.   a) ∃x($x^2 = 2$) is True

       b) ∃x($x^2 = -1$) is false

       c) ∀x($x^2 + 2 \geq 1$) is true

       d) ∀x($x^2 \neq x$) is false

24.   a) Everyone in your class has a cellular phone.

       Let S(x) be a propositional function "x is in your class" and C(x) be a propositional function for "x has a cellular phone".

           1) ∀x(S(x) --> C(x))   2) ∀xC(x)

       b) Somebody in your class has seen a foreign movie

       let S(x) be a propositional function "x is in your class" and M(x) be a propositional function for "x has seen a foreign movie".

           1. ∃xM(x)   2) ∃x(S(x) ^ M(x))

       c) There is a person in your class who cannot swim

       let S(x) be a propositional function "x is in your class" and W(x) be a propositional function for "x can swim".

           1. ∃x¬W(x)   2. ∃x (S(x) ^ ¬W(x))

d)All students in your class can solve quadratic equations.

let S(x) be a propositional function "x is in your class" and Q(x) be a propositional function for "x can solve quadratic equations.

1) $\forall x Q(x)$ 2) $\forall x(S(x) \rightarrow Q(x))$

e) Some students in your class does not want to be rich.

Let S(x) be a propositional function for "x is in your class" and R(x) be a propositional function for "x wants to be rich".

1. $\exists x \neg R(x)$ 2. $\exists x(S(x) \wedge \neg R(x))$