

# Homework 6

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## Question 1

- A)  $\blacktriangle\blacktriangle\square\square$
- B)  $\blacktriangle\blacksquare\blacksquare$
- C)  $\blacktriangle\blacktriangle\blacktriangle$
- D)  $\circ\blacktriangle\square$
- E)  $\square\square\square\circ\circ$
- F)  $\blacktriangle\blacktriangle\blacktriangle\square$
- G)  $\triangle\blacksquare\blacksquare$
- H)  $\blacksquare\blacksquare\triangle$
- I) Impossible since all triangles are not solid, there cannot exist an instance of a toy that is solid and a triangle.
- J)  $\triangle\triangle\blacktriangle\blacksquare$

## Question 2

- A)  $\forall x E(x)$
- B)  $\forall x P(x)$
- C)  $\exists x N(x)$
- D)  $\exists x E(x)$
- E)  $\exists x F(x)$
- F)  $\forall x (P(x) \rightarrow F(x))$
- G)  $\exists x (E(x) \wedge F(x))$
- H)  $\exists x (N(x) \wedge E(x))$
- I)  $\forall x (F(x) \rightarrow E(x))$
- J)  $\exists x (E(x) \wedge P(x))$
- K)  $\forall x (E(x) \wedge P(x))$
- L)  $\neg \exists x E(x)$
- M)  $\forall x \neg N(x)$
- N)  $\exists x \neg F(x)$
- O)  $\neg \forall x P(x)$
- P)  $\forall x (N(x) \rightarrow \neg F(x))$
- Q)  $\exists x (E(x) \wedge \neg P(x))$
- R)  $\forall x (E(x) \rightarrow \neg N(x))$
- S)  $\neg \exists x (F(x) \wedge E(x))$

**Question 3**

- A) All integers are Prime.
- B) There exists an integer that is negative.
- C) All integers are prime and even.
- D) All integers are prime or negative.
- E) All integers that are greater than five are prime.
- F) There exists an integer that is prime and even.
- G) There exists an integer that is not negative or even. (Material Implication)
- H) All integers that are prime are not negative.
- I) There exists an integer that is negative and is not prime.
- J) There does not exist an integer that is negative and even.