CSE191, Fall 2013 Assgts. 3 and 4 Due 9/27 and 10/4, in class

Our office hour lineup remains Mondays 1–3pm (KWR, 326 Davis); Tuesdays 2–4pm (Tianle Ma, 302 Davis); Wednesdays 10–11am (Michael Wehar, 302 Davis) and 1–2:45pm (Tao Wei, 302 Davis); Thursdays 1–2:30pm (KWR). Next week I have just one hour after class on Monday, then I have to catch my flight to Europe, returning late on Tue. Oct. 8.

Reading: This and next week's lectures are in sections 1.5–1.7, and section 1.8 up through "Existence Proofs" ending on page 99. The rest of that section is FYI.

(1) ($5 \times 3 = 15$ pts.)

Translate each of the following into English, where $H(x)$ is the predicate that x hops, and $R(x)$ is the predicate that x is a rabbit.

(a) $(\forall x)(H(x) \longrightarrow R(x))$

(b) $(\forall x)(R(x) \vee H(x))$

(c) $(\exists x)(H(x) \longrightarrow R(x))$

(d) $(\exists x)(R(x) \vee H(x))$.

(e) $(\exists x R(x)) \vee (\exists x H(x))$

Note that this resembles Exercise 8 on page 53, but I've switched and swaped thigs around, and (e) is new. In your answers, pleae state the domain you used for x, such as all animals or 'vanilla anything."

(2) For a followup question, is (e) $(\exists x R(x)) \vee (\exists x H(x))$ equivalent to (d)? Try to answer as best you can—you are not expected to give a formal proof yet. (9 pts.)

(3) Rosen, page 54, exercise 24, all parts. (12 pts. total)

(4) Rosen, page 54, 28(b,c,d,e). ($4 \times 3 = 12$ pts.)

(5) Rosen, page 55, ex. 36, all parts. *Also* say which of the false statements become(s) true when the domain is restricted to the nonnegative integers, that is, to $\mathbf{N}$. (12 pts. total, for 60 on the set)

Assignment 4 – Due Friday 10/4, in class

(1) Rosen, page 67, 28(f,g,h,i). Whenever an existentially quantified sentence is true give a witness; whenever a universally quantified sentence is false give a counter-example. (21 pts. total)

(2) Rosen, page 67, 30(a,b,c). $(3 + 3 + 6 = 12$ pts.)

(3) Rosen, page 78, 4(a–d) $(4 \times 3 = 12$ pts.) *Extra credit:* 6 pts. for (e) with a brief English prose explanation too. (The assignment thus has 93 regular-credit points plus 6 extra-credit points.)

(4) Rosen, page 79, 10(a,b,e,f). $(4 \times 6 = 24$ pts.)

(5) Rosen, page 79, problem 12.—note that this refers to 11. which you should do as practice before looking in the solutions guide. (15 pts.)

(6) Rosen, page 79, problem 14. Show universal-instantiation and modus-ponens as being separate steps here. (9 pts.)

(7) Rosen, page 74, problem 28. (15 pts.)

(8) Rosen, page 91, problem 18. (12 pts., for 120 on the problem set)