**Math 231 – HW 4 Name: Troy Jeffery**

Epp 2nd Ed. 2.3 2, 5 – 9, 11 – 14, 20, 21, 22, 26, 28.

(2) If an integer n equals 2k and , then n is even.

 and 0 is an integer.

**n is an even.**

(5) All healthy people eat an apple a day.

Harry does not eat an apple a day.

**Harry is not a healthy person.**

(6) If a program is correct, then compilation does not produce error messages.

Compilation of this program produces error messages.

**The program is not correct.**

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|  |  | Valid or Invalid? | Justify your answer!   * Summarize the argument using symbols. | * If the argument is valid, say if it is by the conditional or the contrapositive. * If it’s invalid, say if it is the inverse error or the converse error. |
| (7) | All healthy people eat on apple a day.  Helen eats an apple a day.  Helen is a healthy person. | **Invalid** | Let H(x): healthy, and A(x): eats apples.  **H(x) => A(x)**  **A(Helen)**  **H(Helen)** | **Converse Error** |
| (8) | All freshmen take writing.  Caroline is a freshman.  Caroline must take writing. | **Valid** | Let F(x): is a freshman, and W(x): takes writing.  **F(x) => W(x)**  **F(Caroline)**  **W(Caroline)** | **Conditional** |
| (9) | All healthy people eat on apple a day.  Herbert is not a healthy person  Herbert does not eat an apple a day. | **Invalid** | Let H(x): healthy, and A(x): eats apples.  **H(x) => A(x)**  **~H(Herbert)**  **~A(Herbert)** | **Inverse Error** |

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| (11) | All cheaters sit in the back row.  George sits in the back row.  George is a cheater. | **Invalid** | Let C(x): is cheater, and B(x): sits in back row.  **C(x)=>B(x)**  **B(George)**  **(George)** | **Converse Error** |
| (12) | All honest people pay their taxes.  Darth is not honest.  Darth does not pay his taxes. | **Invalid** | Let H(x): honest, and T(x): pays taxes  **H(x) => T(x)**  **~H(Darth)**  **~T(Darth)** | **Converse Error** |
| (13) | For all students x, if x studies discrete math, then x is good at logic.  Dawn studies discrete math.  Dawn is good at logic. | **Valid** | Let D(x): discrete math, and G(x): good at logic  **D(x) => G(x)**  **D(Dawn)**  **G(Dawn)** | **Conditional** |
| (14) | If compilation produces error messages, then the program is not correct.  Compilation of this program did not produce error messages.  Program is correct. | **Invalid** | Let E(x): errors, and C(x): correct.  **E(x) => ~D(x)**  **~E(ThisProgram)**  **C(ThisProgram)** | **Inverse Error** |

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|  |  | Valid or Invalid? | Justify your answer!   * Summarize the argument by drawing a diagram. | * If the argument is invalid, explain why. |
| (20a) | All dogs are carnivorous.  Felix is not a dog.  Felix is not carnivorous. | **Invalid** |  | **Inverse Error;**  **Felix could be a zombie in search of human brains.** |
| (20b) | , if P(x), then Q(x).  for a particular a. | **Invalid** |  | **Inverse Error;**  **~P(a) can logically exist in multiple locations.** |
| (21) | All people are mice.  All mice are mortal.  All people are mortal. | **Valid** |  |  |
| (22) | All discrete math students can tell valid from invalid.  All thoughtful people can tell valid from invalid.  All discrete math students are thoughtful. | **Invalid** |  | **Converse Error;**  **M => V**  **T => V**  **M ≠> T** |
| (26) | Nothing intelligible ever puzzles me.  Logic puzzles me.  Logic is unintelligible. | **Valid** |  |  |

Now do problem 28. Write down the clues in order and write down your intermediate conclusions.

**(4) I can’t understand examples if the arguments are not arranged in regular order like the ones I’m used to.**

**(2) The arguments in these examples are not arranged in regular order like the ones I am used to.**

**I can’t understand these examples.**

**(1) When I work logic examples without grumbling, you may be sure it is one I understand.**

**I’m literally grumbling right now.**

**(5) I never grumble at an example unless it gives me a headache.**

**I have a headache.**

**(3) No easy examples make my head ache.**

**The author is not only rearranging the example, but these problems are also hard.**