Section 1: **Logic Games**. Instructions: Answer the following questions. When justification is required, provide it.

Baby game 1: Six objects, 2-7, are grouped as follows: All of the primes are red and all of the nonprimes are green. (A prime is any positive integer whose only factors are 1 and itself.) Which of the following claims, then, are true? Briefly explain. Each question is worth 6 points

1. If 2 and 4 are red, then 6 and 4 are green.
2. If 4 is green, then neither 2 nor 6 are red.
3. If neither 2 nor 3 are green, then 7 is not red.
4. If 5 is not red, then 6 is not green.

Baby game 2: A-E must be ordered in accordance with the following rules.

Rule 1: If D is after E, then B is before C.

Rule 2: If D is not before C, then C is not before A.

Rule 3: A and D are both before C only if E is before C.

Rule 4: A and E are before C if and only if A is before D.

Which of the following orderings are legal? Briefly justify your answers. Each question worth 6 points

1. D A E C B
2. A B C D E
3. E B A C D

LSAT Logic Game: You are picking your summer school courses. You must take at least three courses from among the following: History, linguistics, music, physics, theater, statistics, and writing. The following conditions must hold true.

If you take history, then you take neither statistics nor music.

If you take music, then you take neither physics nor theater.

If you take writing, then you take neither physics nor statistics.

Each question worth 5 points

9) Which of the following is groups of courses could you take?

a) history, linguistics, statistics

b) history, music, physics

c) history, physics, theater

d) linguistics, physics, theater, writing

e) music, theater, writing

10) What is the maximum number of courses you could take?

a) seven

b) six

c) five

d) four

e) three

11) If you take neither physics nor writing, then it could be true that you also take neither

a) history nor linguistics

b) history nor music

c) history nor statistics

d) linguistics nor music

e) statistics nor theater

12) If you take music, then which one of the following must you also take?

a) writing

b) theater

c) statistics

d) physics

e) linguistics

Section 2: **Semantic Proofs**. Instructions: For each of the following claims of logical consequence, on a separate piece of paper establish its truth by semantic proof.

13) p∧q ⊨ p∨q 10 points

14) p→q ⊨ ¬q→¬p 15 points

Section 3: **Derivations**. Instructions: For each of the following claims of derivability, on a separate piece of paper establish its truth by constructing a derivation. For the first three derivations, only use the “basic inference rules.” For the last two derivations, use both the “basic inference rules” and →I.

15) p∧q  p∨q

16) q→¬¬r, p∧(q^q)  p∧(r∧q)

17) p∧q, ¬¬(p→r)↔q  r∨¬¬r

18) p↔q, r↔p  q→r

19) (¬r∨p)→q  p→(q∨r)

Extra credit

(p∧q)→r  p→(q→r)





