Identity theory Handout

Part One: Translations

I. How can we derive the following?
1. Superman can fly.
2. Superman is Clark Kent.
∴ Clark Kent can fly.

II. *Simple Identity translations*:
1. Clark Kent is Superman. (c, s)

2. Mary Ann Evans is George Eliot. (m, g)

III. *Using 'Only' and 'Except'*:
3. John loves Mary. (j, m, Lxy: x loves y)

4. John only loves Mary.

5. Only John loves Mary.

6. Everyone loves Mary.

7. Everyone except John loves Mary.

IV. *Superlatives*:
8. Degas is a better impressionist than Monet. (d, m, Ix, Bxy: x is better than y)

9. Degas is the best impressionist.

10. Bill Gates is the geek with the most money. (g, Gx, Mxy: x has more money than y)

11. Philadelphia is the nearest major city. (p, Mx: x is a major city, Nxy: x is nearer than y)

V. *Numerical operators*:
12. There is only one applicant for the job. (Ax)

13. There is at least one applicant for the job.

14. There are at least two applicants.

15. There are exactly two applicants.

16. There is at most one applicant.

17. There are at most two applicants.

VI. *Definite descriptions*:
18. The King of France is bald. (Kx, Bx)
A. There is a King of France.

B. There is only one King of France.

C. That thing is bald.

19. The country called a sub-continent is India (Cx, Sx)
A.

B.

C.

20. The author of Waverly was a genius. (Wx, Gx)

VII. Mixing it up.
1. Everything is identical with itself.

2. Nothing is distinct from itself.

3. The discoverer of Polonium is Polish. (Dx, Px)

4. At most two persons invented the airplane. (Px, Ix)

5. There is exactly one dollar bill in my wallet. (Dx, Wx)

6. Adriana is a better dancer than Rene. (a, r, Dx, Bxy: x is better than y)

7. Adriana is the best dancer.

8. There are exactly two dancers better than Adriana.

VIII. Translate the following:
1. Everything is identical with something.

2. There are prime numbers. (Px, Nx)

3. Two is the only even prime number. (t, Ex, Px, Nx)

4. There is exactly one even prime number.

5. There are at least two odd prime numbers. (Ox, Px, Nx)

6. All prime numbers are odd except the number two.

7. The murderer was Colonel Mustard. (m, Mx)

8. There is at least one dancer better than Rene.

9. Rene is the worst dancer.

10. Goliath is the tallest human. (g, Hx, Txy: x is taller than y)

Part Two: Derivations: Derive the conclusions of each of the following:

1)   1. (x)(Dx ⊃ Ex)
        2. Da
        3. a=b   /Eb

2)   1. (x)(Ax ⊃ Bx)
        2. ~Bf
        3. Ae   /f≠e

3)   1. (x)(Hx ⊃ Jx)
        2. (x)(Kx ⊃ Lx)
        3. Hd · Kc
        4. c=d   /Jc · Ld

4)   1. (x)(y) x=y
        2. (x)Mxx   /Mab

5)   1. (x)[(∃y)Kxy ⊃ (∃z)Kzx]
      2. (∃x)(Kxg · x=b)   /(∃z)Kzb

6)   1. (∃x)Hx
        2. (x)(y)[(Hx · Hy) ⊃ x=y]   /(∃x)[Hx · (y)(Hy ⊃ x=y)]