Question 2

1. Michelle, Sheryl and Berne are the members of WiCS.

WiCS(Michelle), WiCS(Sheryl), WiCS(Berne)

1. Each member of WiCS is either a Physics major, CS major or both.

∀x WiCS(x) ⇒ ((Phy(x) ∧ ¬Com(x)) ∨ (¬Phy(x) ∧ Com(x)) ∨ ( Phy(x) ∧ Com(x)))

∀x WiCS(x) ⇒ (Phy(x) ∨ Com(x)

1. None of the CS majors study Mechanics and all the Physics majors take Scientific computing.

¬∃x (Com(x) ∧ enroll(x, Mechanics)) ∧ ∀x Phy(x) ⇒ enroll(x, Scientific Computing)

1. Michelle is enrolled in courses that Sheryl is not, and is not in the courses that Sheryl is enrolled in.

∀y enroll(Sheryl, y) ⇒ ¬enroll(Michelle, y) ∧ ¬enroll(Sheryl, y) ⇒ enroll(Michelle, y)

1. Sheryl is not enrolled in Mechanics and Scientific Computing.

¬enroll(Sheryl, Mechanics) ∧ ¬enroll(Sheryl, Scientific Computing)

1. There is a WiCS member, who is a CS major but not a Physics major

∃x WiCS(x) ∧ Com(x) ∧ ¬Phy(x)

**First to convert to CNF:**

WiCS(Michelle), WiCS(Sheryl), WiCS(Berne)

∀x ¬WiCS(x) ∨ Phy(x) ∨ Com(x)

∀x (¬Com(x) ∨ ¬enroll(x, Mechanics)) ∧ (¬Phy(x) ∨ enroll(x, Scientific Computing))

∀y (¬enroll(Sheryl, y) ∨ ¬enroll(Michelle, y)) ∧ (enroll(Sheryl, y) ∨ enroll(Michelle, y))

¬enroll(Sheryl, Mechanics) ∧ ¬enroll(Sheryl, Scientific Computing)

**Finally negate the target statement**

∀x ¬WiCS(x) ∨ ¬Com(x) ∨ Phy(x)

Dropping the Universal quantifiers

1. WiCS(Michelle)
2. WiCS(Sheryl)
3. WiCS(Berne)
4. ¬WiCS(i) ∨ Phy(i) ∨ Com(i)
5. ¬Com(j) ∨ ¬enroll(j, Mechanics)
6. ¬Phy(k) ∨ enroll(k, Scientific Computing)
7. ¬enroll(Sheryl, m) ∨ ¬enroll(Michelle, m)
8. ¬enroll(Michelle, n) ∨ ¬enroll(Sheryl, n)
9. ¬enroll(Sheryl, Mechanics)
10. ¬enroll(Sheryl, Scientific Computing)
11. ¬WiCS(x) ∨ ¬Com(x) ∨ Phy(x) \*\*\* Negated Target statement\*\*\*

¬WiCS(x) ∨ ¬Com(x) ∨ Phy(x)

¬WiCS(i) ∨ Phy(i) ∨ ¬Com(i)

¬WiCS(i) ∨ Phy(i)

{i/x}

¬Phy(k) ∨ enroll(k, Scientific Computing)

¬WiCS(k) ∨ enroll(k, Scientific Computing)

{k/i}

WiCS(Sheryl)

enroll(Sheryl, Scientific Computing)

¬enroll(Sheryl, Scientific Computing)

From the Resolution tree the contradiction of the conclusion is an empty clause.