**Problem 1**

4

-7

0

+8

-5

+4

7

6

9

5

3

5

8

**Problem 2**

-7

7

3

4

5

6

2

+5

+5

+5

-8

+0

+0

**Problem 3**

27

1.

17

18

24

24

25

35

35

14

14

30

32

95

50

19

105

45

13

5

New York

Chicago

Memphis

St. Louis

San Diego

Denver

Los Angeles

+0

-1

+0

+1

+0

2. Let be the binary variable representing whether route from city i to city j is selected when route ij is selected, otherwise, , where

Objective:

Constraints:

**Problem 4**

1. Let be the number of cars delivered from I to j, where

Objective:

Constraints: