**Name:** **Class/Set:**

# Discrete - Prim and Kruskal

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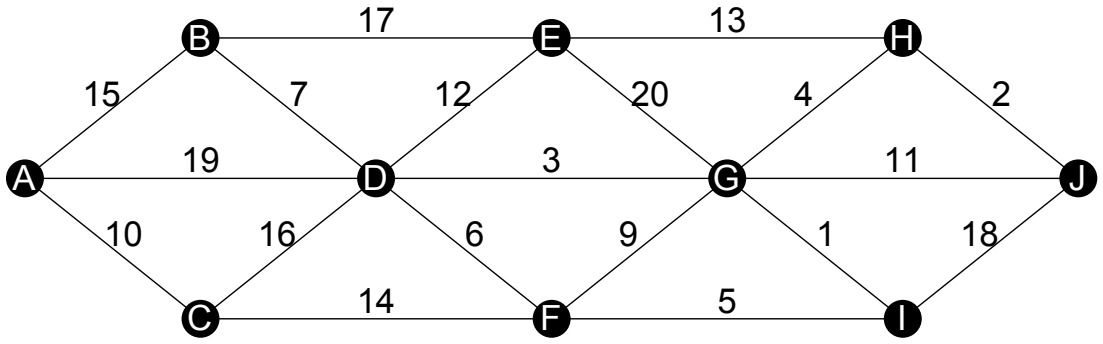
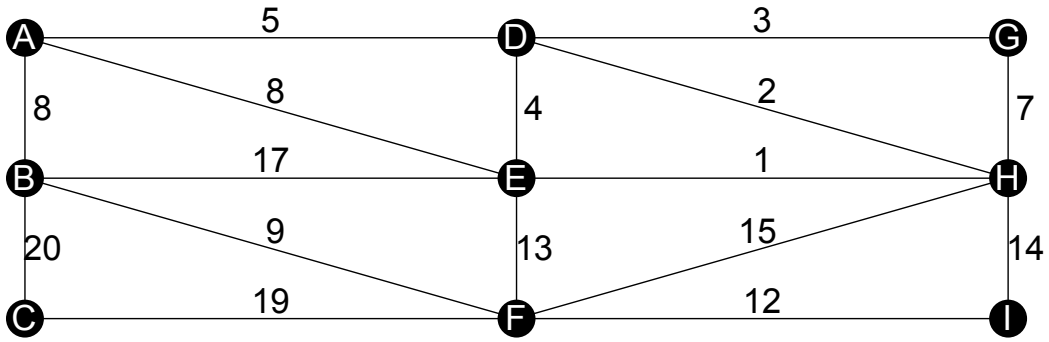
1: Find the Minimum Spanning Tree using Prim's Algorithm starting from vertex A:

a)



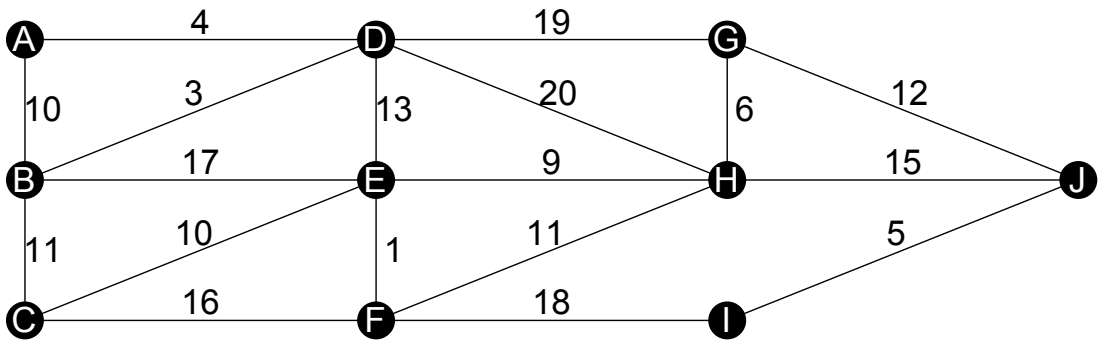

Arcs/Length:

b)



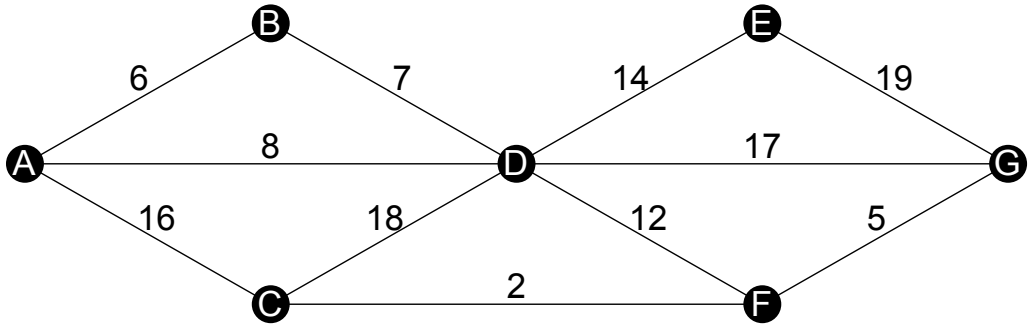

Arcs/Length:

c)




Arcs/Length:

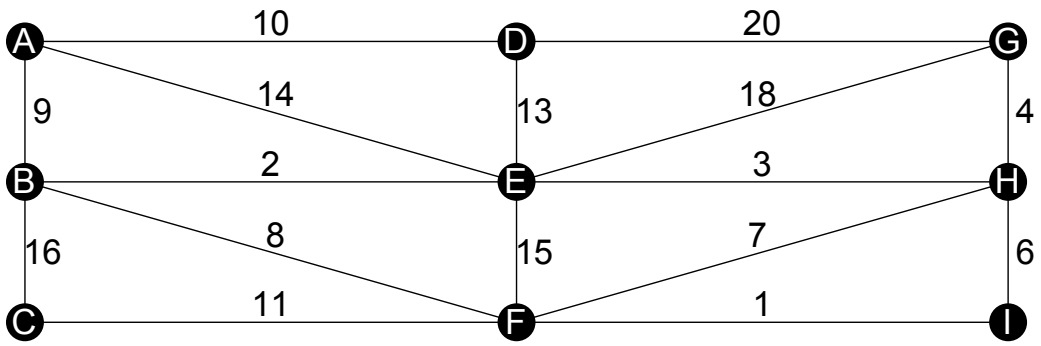
d)




Arcs/Length:

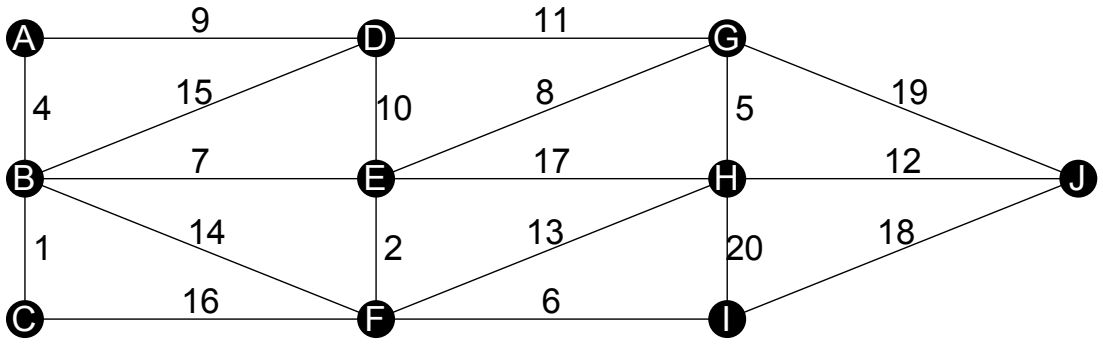
2: Find the Minimum Spanning Tree using Kruskal's Algorithm:

a)



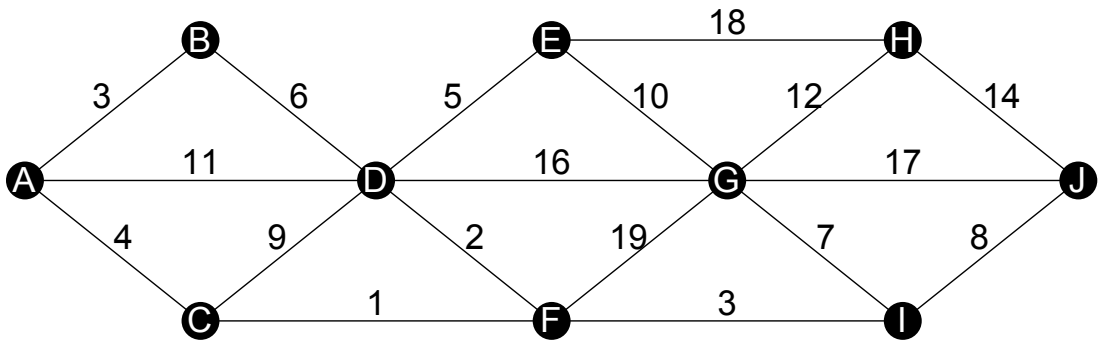

Arcs/Length:

b)



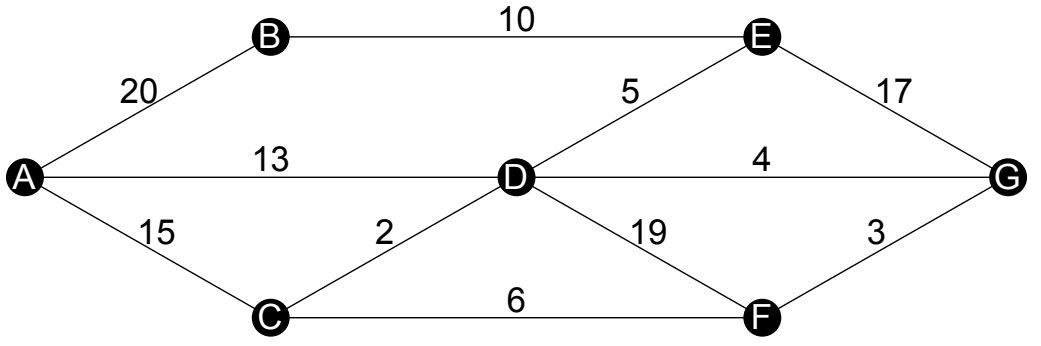

Arcs/Length:

c)




Arcs/Length:

d)




Arcs/Length:

3: Find the Minimum Spanning Tree using Prim's Algorithm starting from vertex A:

a)

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| A | – | 29 | 7 | 12 | 17 | 18 |
| B | 29 | – | 24 | 9 | 19 | 6 |
| C | 7 | 24 | – | 26 | 14 | 21 |
| D | 12 | 9 | 26 | – | 3 | 28 |
| E | 17 | 19 | 14 | 3 | – | 16 |
| F | 18 | 6 | 21 | 28 | 16 | – |

Arcs:
Total length=

b)

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| A | – | 5 | 11 | 30 | 25 | 27 | 8 |
| B | 5 | – | 1 | 15 | 22 | 13 | 2 |
| C | 11 | 1 | – | 10 | 23 | 20 | 4 |
| D | 30 | 15 | 10 | – | 12 | 26 | 3 |
| E | 25 | 22 | 23 | 12 | – | 24 | 19 |
| F | 27 | 13 | 20 | 26 | 24 | – | 14 |
| G | 8 | 2 | 4 | 3 | 19 | 14 | – |

Arcs:
Total length=

c)

| | A | B | C | D | E |
|---|---|---|---|---|---|
| A | – | 6 | 16 | 1 | 5 |
| B | 6 | – | 25 | 29 | 28 |
| C | 16 | 25 | – | 8 | 30 |
| D | 1 | 29 | 8 | – | 21 |
| E | 5 | 28 | 30 | 21 | – |

Arcs:
Total length=

d)

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| A | – | 23 | 10 | 20 | 7 | 13 | 22 |
| B | 23 | – | 2 | 4 | 27 | 9 | 15 |
| C | 10 | 2 | – | 18 | 17 | 11 | 25 |
| D | 20 | 4 | 18 | – | 1 | 12 | 8 |
| E | 7 | 27 | 17 | 1 | – | 29 | 16 |
| F | 13 | 9 | 11 | 12 | 29 | – | 6 |
| G | 22 | 15 | 25 | 8 | 16 | 6 | – |

Arcs:
Total length=

e)

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| A | – | 13 | 21 | 7 | 2 | 22 |
| B | 13 | – | 19 | 3 | 26 | 24 |
| C | 21 | 19 | – | 9 | 5 | 4 |
| D | 7 | 3 | 9 | – | 18 | 10 |
| E | 2 | 26 | 5 | 18 | – | 15 |
| F | 22 | 24 | 4 | 10 | 15 | – |

Arcs:
Total length=

f)

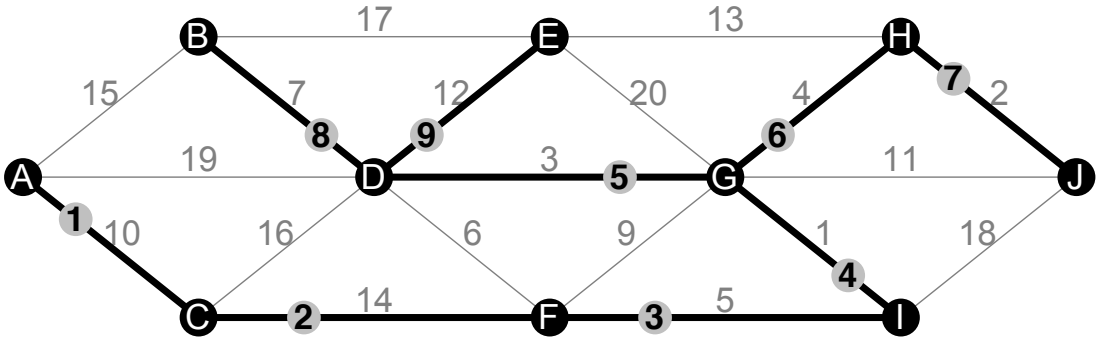
| | A | B | C | D | E |
|---|---|---|---|---|---|
| A | – | 27 | 14 | 30 | 20 |
| B | 27 | – | 17 | 23 | 28 |
| C | 14 | 17 | – | 11 | 19 |
| D | 30 | 23 | 11 | – | 3 |
| E | 20 | 28 | 19 | 3 | – |

Arcs:
Total length=

# Answers: Discrete - Prim and Kruskal

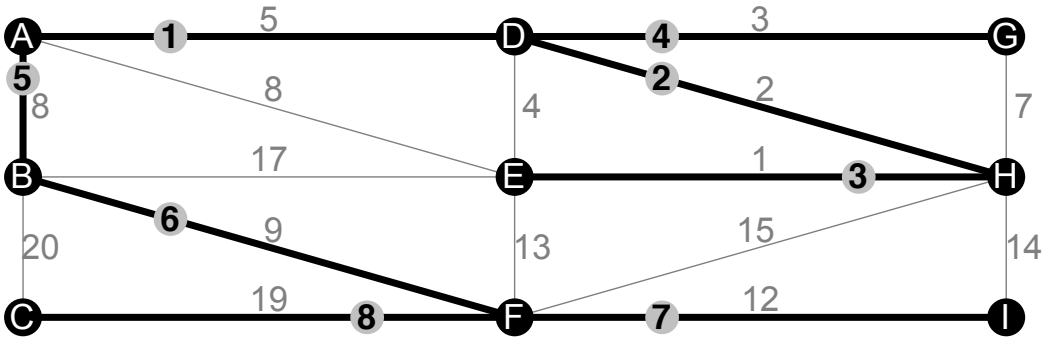


1: a)



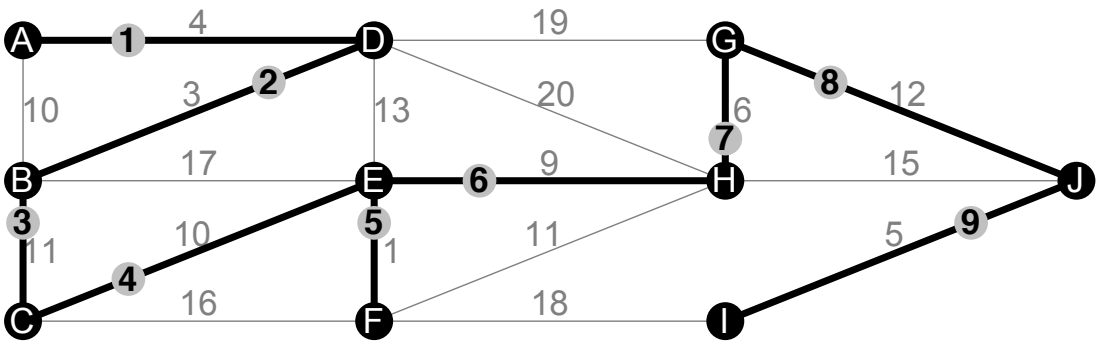

Arcs: AC, CF, FI, IG, GD, GH, HJ, DB, DE. Total length=58

b)



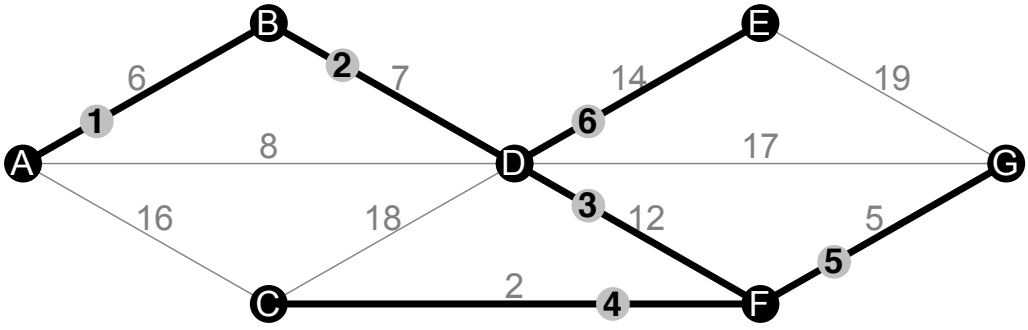

Arcs: AD, DH, HE, DG, AB, BF, FI, FC. Total length=59

c)



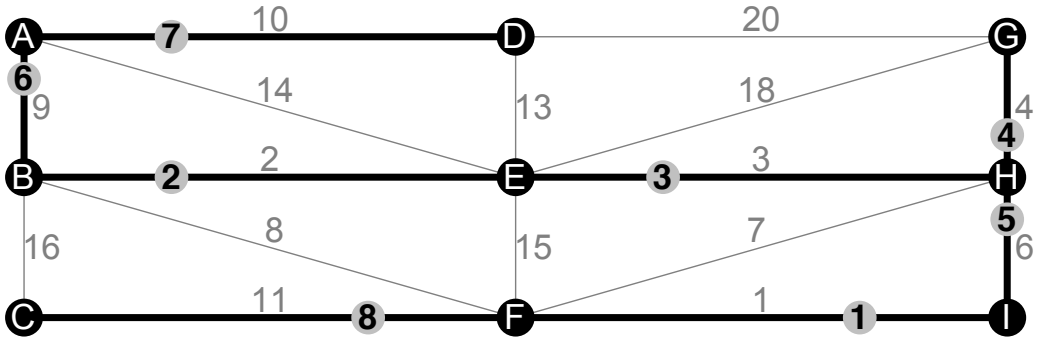

Arcs: AD, DB, BC, CE, EF, EH, HG, GJ, JI. Total length=61

d)



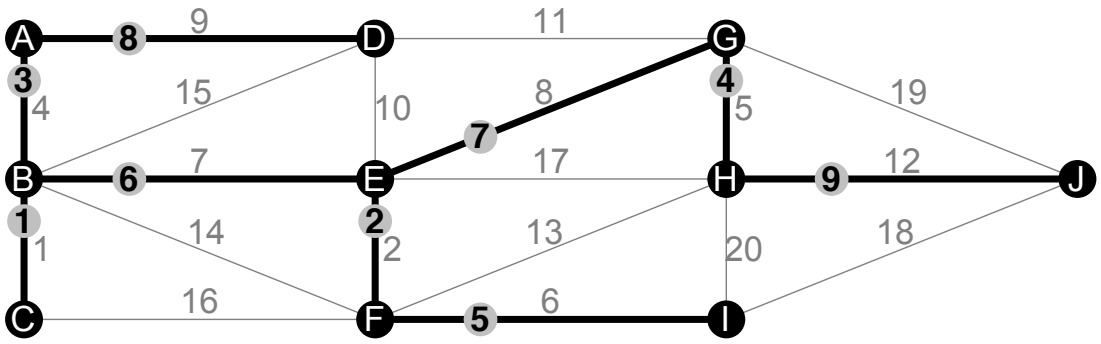

Arcs: AB, BD, DF, FC, FG, DE. Total length=46

2: a)



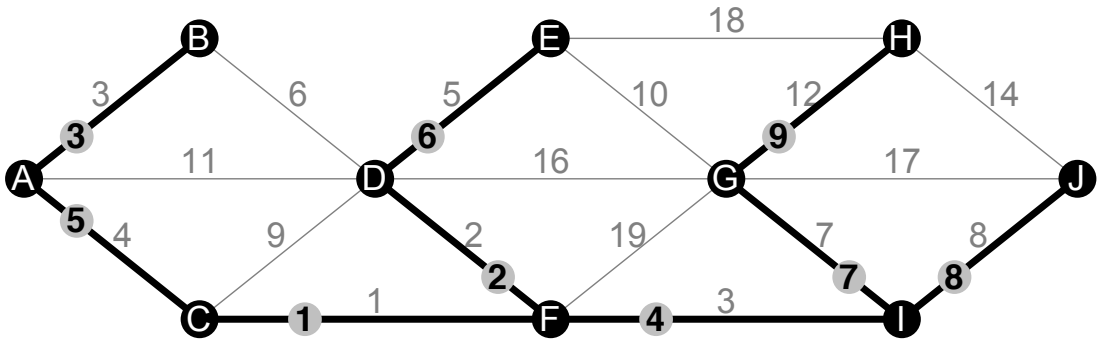

Arcs: IF, BE, EH, HG, HI, AB, AD, FC. Total length=46

b)



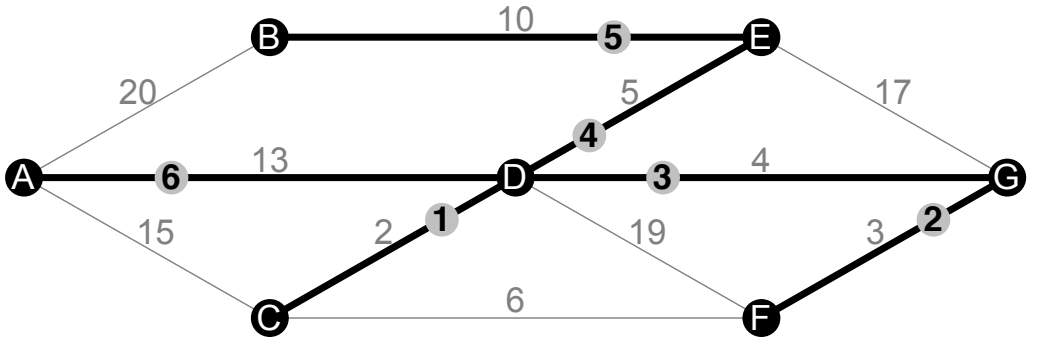

Arcs: BC, EF, AB, GH, FI, BE, EG, AD, HJ. Total length=54

c)




Arcs: CF, FD, AB, FI, AC, DE, IG, IJ, GH. Total length=45

d)




Arcs: DC, GF, DG, DE, EB, AD. Total length=37

3: a)

| | A (1) | B (5) | C (2) | D (3) | E (4) | F (6) |
|---|---|---|---|---|---|---|
| A | – | 29 | 7 | 12 | 17 | 18 |
| B | 29 | – | 24 | (9) | 19 | 6 |
| C | (7) | 24 | – | 26 | 14 | 21 |
| D | (12) | 9 | 26 | – | 3 | 28 |
| E | 17 | 19 | 14 | (3) | – | 16 |
| F | 18 | (6) | 21 | 28 | 16 | – |

Arcs: AC, AD, DE, DB, BF.
Total length=37

b)

| | A (1) | B (2) | C (3) | D (5) | E (6) | F (7) | G (4) |
|---|---|---|---|---|---|---|---|
| A | – | 5 | 11 | 30 | 25 | 27 | 8 |
| B | (5) | – | 1 | 15 | 22 | 13 | 2 |
| C | 11 | (1) | – | 10 | 23 | 20 | 4 |
| D | 30 | 15 | 10 | – | 12 | 26 | (3) |
| E | 25 | 22 | 23 | (12) | – | 24 | 19 |
| F | 27 | (13) | 20 | 26 | 24 | – | 14 |
| G | 8 | (2) | 4 | 3 | 19 | 14 | – |

Arcs: AB, BC, BG, GD, DE, BF.
Total length=36

c)

| | A (1) | B (4) | C (5) | D (2) | E (3) |
|---|---|---|---|---|---|
| A | – | 6 | 16 | 1 | 5 |
| B | (6) | – | 25 | 29 | 28 |
| C | 16 | 25 | – | (8) | 30 |
| D | (1) | 29 | 8 | – | 21 |
| E | (5) | 28 | 30 | 21 | – |

Arcs: AD, AE, AB, DC.
Total length=20

d)

| | A (1) | B (4) | C (5) | D (3) | E (2) | F (7) | G (6) |
|---|---|---|---|---|---|---|---|
| A | – | 23 | 10 | 20 | 7 | 13 | 22 |
| B | 23 | – | 2 | (4) | 27 | 9 | 15 |
| C | 10 | (2) | – | 18 | 17 | 11 | 25 |
| D | 20 | 4 | 18 | – | (1) | 12 | 8 |
| E | (7) | 27 | 17 | 1 | – | 29 | 16 |
| F | 13 | 9 | 11 | 12 | 29 | – | (6) |
| G | 22 | 15 | 25 | (8) | 16 | 6 | – |

Arcs: AE, ED, DB, BC, DG, GF.
Total length=28

e)

| | A (1) | B (6) | C (3) | D (5) | E (2) | F (4) |
|---|---|---|---|---|---|---|
| A | – | 13 | 21 | 7 | 2 | 22 |
| B | 13 | – | 19 | (3) | 26 | 24 |
| C | 21 | 19 | – | 9 | (5) | 4 |
| D | (7) | 3 | 9 | – | 18 | 10 |
| E | (2) | 26 | 5 | 18 | – | 15 |
| F | 22 | 24 | (4) | 10 | 15 | – |

Arcs: AE, EC, CF, AD, DB.
Total length=21

f)

| | A (1) | B (5) | C (2) | D (3) | E (4) |
|---|---|---|---|---|---|
| A | – | 27 | 14 | 30 | 20 |
| B | 27 | – | (17) | 23 | 28 |
| C | (14) | 17 | – | 11 | 19 |
| D | 30 | 23 | (11) | – | 3 |
| E | 20 | 28 | 19 | (3) | – |

Arcs: AC, CD, DE, CB.
Total length=45