Question 1. For the graph G pictured bellow describe:

1. list all edges incident with vertex 3
2. list all vertices incident with edge d
3. list all edges that join vertices 7 and 6.

3

Answer 1.

1. edges incident with vertex 3 is

b, d, m, i

2. vertices incident with edge d is

3, 2

3. if edge $e=(u,v)$ then we say edge e is joins u and v; however when we look at vertices 7 and 6 there is no such an edge.

Question 2. For the graph 6 from Qestion 1:

1. give one walk that is not a trail from vertex 6 to vertex 1
2. give one trail that is not a path from vertex 6 to vertex 1
3. give one path from vertex 6 to vertex 1

Answer 2.

1. $\langle 6, h, 5, m, 3, i, 6, h, 5, k, 1 \rangle$
2. $\langle 6, h, 5, m, 3, i, 6, g, 4, c, 1 \rangle$
3. $\langle 6, g, 4, c, 1 \rangle$

Question 3 for the graph 6 from Qestion 1:

1. give one closed walk that is not a circuit starting at vertex 6
2. give one circuit that is not a cycle starting at vertex 6
3. give one cycle starting at vertex 6

Answer 3.

1. <6, h, 5, l, 2, d, 3, m, 5, h, 6>
2. <6, h, 5, l, 2, d, 3, m, 5, k, 1, c, 4, g, 6>
3. <6, i, 3, m, 5, h, 6>

Question 4. Let Q_n be the graph with vertex set $\{1, 2, \ldots, n\}$. Two vertices are adjent if and only if their greatest common divisor is 2. Draw Q_{16}

Answer 4.

First of all, lets find vertices and their adjacent vertices

Vertex 2 adjacent with

4, 6, 8, 10, 12, 14, 16

Vertex 4 adjocent with

2, 6, 10, 14

Vertex 6 adjacent with

2, 4, 8, 10, 14, 16

Vertex 8 adjacent with

2, 6, 10, 14

Vertex 10 adjacent with

2, 4, 6, 8, 12, 14, 16

Vertex 12 adjacent with

2, 10, 14

Vertex 14 adjacent with

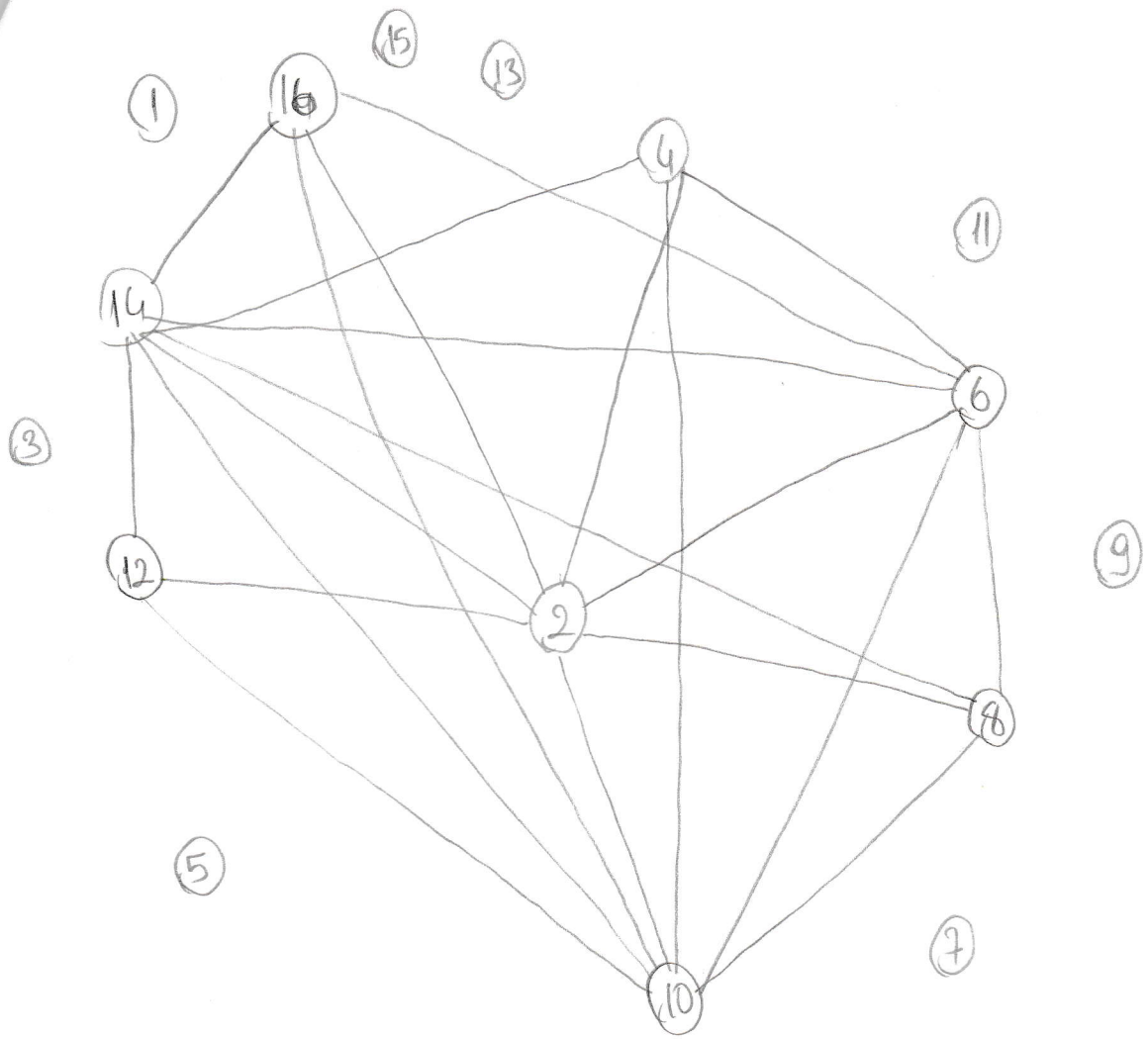
2, 4, 6, 8, 10, 12, 16

Vertex 16 adjacent with

2, 6, 10, 14

and other vertices 1, 3, 5, 7, 9, 11, 13, 15 has no adjecent vertices.

If we need to draw this graph;


15
13
1
16
4
11
14
6
3
12
9
2
8
5
7
10

Question 5. As in Question 4, Let Q_n be the graph with vertex set $\{1,2,-,n\}$ where vertices are adjacent if and only if their greatest common divisor is 2.

1. give the neighborhood of vertex 4 in Q_{18};
2. if one exists, give one cycle of length three in Q_{25} containing vertex 19;
3. if one exists, give one path in Q_{85} from 13 to vertex 2.

Answer 5.

1. $N(4) = \{2, 6, 10, 14, 18\}$
2. There is no vertex which adjacent with vertex 19 so we can't give such cycle containing vertex 19
3. vertex 13 doesn't have any adjacent vertex so there is no connection with any other vertex. We can't give such an example.