

[◀ Previous](#)



[Next ▶](#)

## Practice questions: Graphs and Paths

[🔖](#) [Bookmark this page](#)

# Questions on Graphs and Paths

5/5 points (ungraded)

1. A graph is composed of two key elements. What are they?

☐ A set of circles and a set of lines

☒ A set of vertices and a set of edges

☐ Pairs of vertices



2. Edges in graphs and in digraphs are different. What do they respectively correspond to?

☐ Couples/Pairs

☒ Pairs/Couples

☐ Pairs/Pairs



### Explanation

In graphs, there is no difference between the edge from  $u$  to  $v$  and that from  $v$  to  $u$ ; we therefore use pairs to represent edges. In digraphs, there can be an edge from  $u$  to  $v$  even if there is no edge from  $v$  to  $u$ . So, we use couples instead of pairs.

3. Consider the vertex sequence  $\{v_1, v_2\}, \{v_2, v_4\}, \{v_4, v_6\}$  in a complete graph with vertices  $V = \{v_1, v_2, v_3, v_4, v_5, v_6\}$ . Which of the following statements is true?

☒ It is a path

☐ It is a cycle

☐ It is a walk



### Explanation

It is not a cycle because the extremities ( $v_1$  and  $v_6$ ) are not identical. It is not a walk because a walk is a sequence of vertices, not a sequence of edges. It is a path, obtained from the vertex sequence  $v_1, v_2, v_4, v_6$ .

4. Consider  $V = \{v_1, v_2, v_3, v_4\}$ . For which following values of  $E$  is  $G = (V, E)$  a tree (two correct answers)?

☐  $\{\{v_1, v_2\}, \{v_2, v_3\}, \{v_3, v_4\}, \{v_1, v_4\}\}$

☒  $\{\{v_1, v_2\}, \{v_2, v_3\}, \{v_3, v_4\}\}$

☐  $\{\{v_1, v_2\}, \{v_3, v_4\}\}$

☒  $\{\{v_1, v_2\}, \{v_1, v_3\}, \{v_1, v_4\}\}$



### Explanation

Case 1 is not a tree because there is a cycle:  $\{v_1, v_2\}, \{v_2, v_3\}, \{v_3, v_4\}, \{v_1, v_4\}$ . Case 3 is not a tree because the graph is not connected; there is no path between vertices  $v_1$  and  $v_3$ , for example. Case 2 and Case 4 are trees because they do not contain a cycle and are connected.

5. What is the size of a complete graph with an order of  $n$ ?

☐  $2^n$

☐  $n^2$

☒  $n(n-1)/2$



#### Explanation

To identify an edge, you need to choose two vertices among the  $n$  ones. So, the number of edges is  $\binom{n}{2} = n(n-1)/2$ . Note that, for a digraph, the number of edges would be  $n^2$ .

Submit

**i** Answers are displayed within the problem

< Previous

Next >

© All Rights Reserved



## edX

[About](#)

[Affiliates](#)

[edX for Business](#)

[Open edX](#)

[Careers](#)

[News](#)

## Legal

[Terms of Service & Honor Code](#)

[Privacy Policy](#)

[Accessibility Policy](#)

[Trademark Policy](#)

[Sitemap](#)

## Connect

[Blog](#)

[Contact Us](#)

[Help Center](#)

[Media Kit](#)

[Donate](#)



