

GRAPHS HOMEWORK

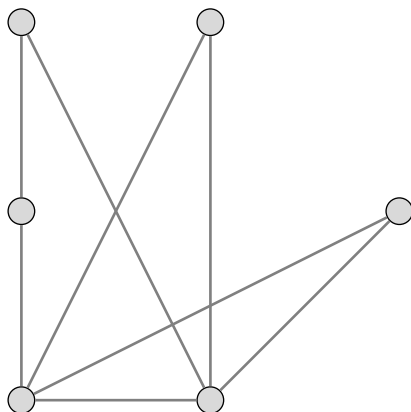
TEXT: 12.1, 12.2, 12.3

LAST NAME	FIRST NAME	DATE
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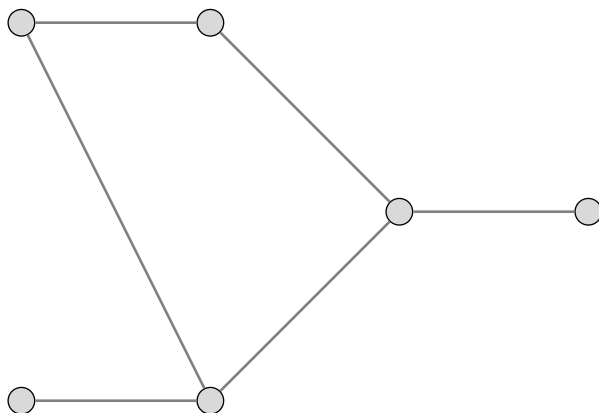
For each of the following graphs,

- State the number of vertices
- State the number of edges
- Label the degree of each vertex

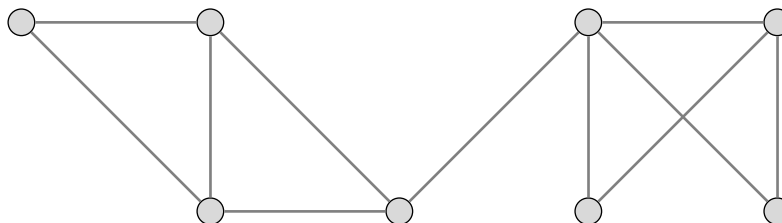
1.



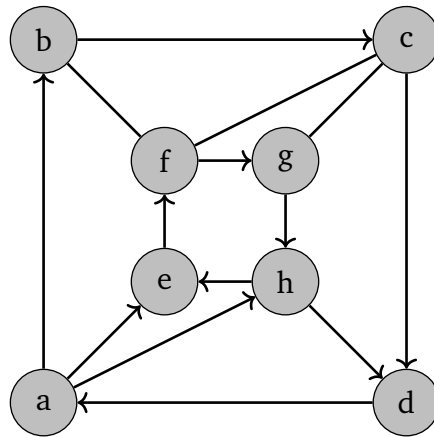
2.



3.



4. Fill out the adjacency matrix for the shown directed graph. Follow the convention whereas an arrow from P to Q is an adjacency entry in the row P and column Q .



	a	b	c	d	e	f	g	h
a								
b								
c								
d								
e								
f								
g								
h								

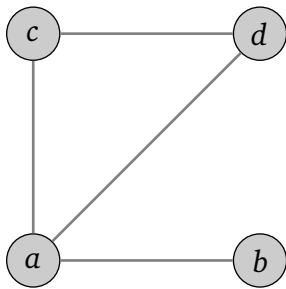
5. Draw the utilities graph $K_{3,4}$.
Label the degree of each vertex.
How many edges does the graph have?

6. Draw the utilities graph $K_{5,5}$.
Label the degree of each vertex.
How many edges does the graph have?

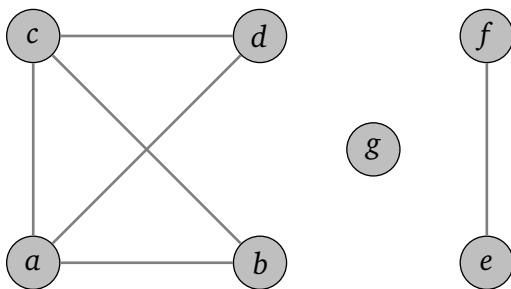
7. Draw the complete graph K_6 .
 What is the degree of each vertex?
 How many edges does the graph have?

8. Draw the complete graph K_9 .
 What is the degree of each vertex?
 How many edges does the graph have?

9. Draw a complement of the given graph:



10. Draw a complement of the given graph:



For each of the following questions, explain your reasoning with a logical argument and/or an illustrative drawing.

11. What is the degree of each vertex in the graph K_n ?

12 (†). How many edges does the graph K_n have?

13. What are the degrees of vertices in the utilities graph $K_{n,m}$? More specifically, how many vertices of each degree are there?

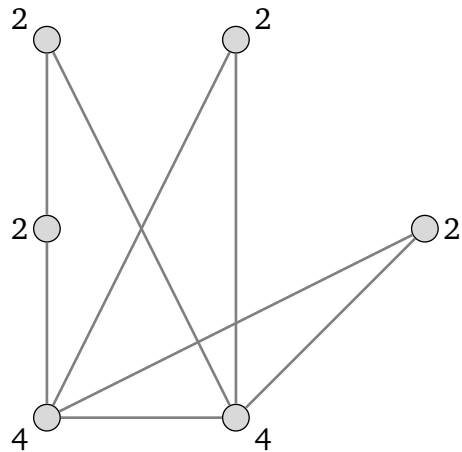
14. How many edges does the graph $K_{n,m}$ have?

15. Draw a graph where vertices are integers from 12 to 20, and two vertices are related iff they have at least one prime factor in common. For example, 12 and 14 have a prime factor in common: they are both divisible by 2. On the other hand, 14 and 15 have no prime factors in common.

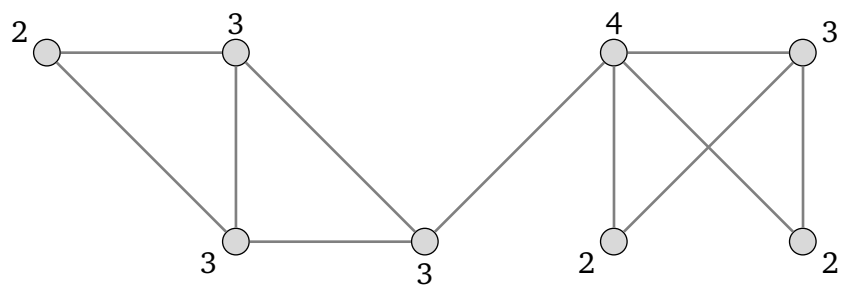
16. Draw an undirected graph without loops or multiple edges with 4 vertices each of degree 3 and one vertex of degree 2.

ANSWERS

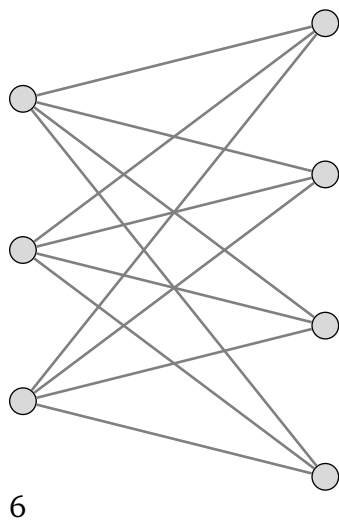
1. 6 vertices and 8 edges



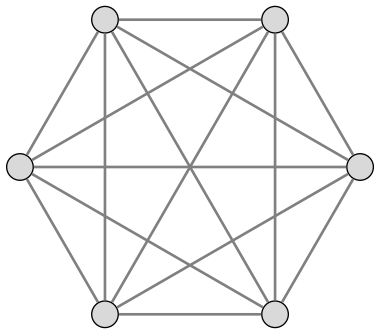
3. 8 vertices and 11 edges



5. This graph has 12 edges. The degree of each vertex on the left side is 4, and the degree of each vertex on the right is 3.



7. The degree of each vertex is 5, and there are 15 edges.



9.

