

Review for Exam II MTH 213, This is not the test
but to test a test

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QUESTION 1. 1) Let $n = 7^3 \cdot 5^5 \cdot 120^4$. Find $\phi(n)$.

2) Let $b = (11001010001)_2$.

a) Find the value of b in base 10.

b) find $5^b \pmod{33333}$

3) a) Let $n = 322$ and $m = 222$. Write n as $k\phi(m) + r$.

Use (a) to find $27^n \pmod{m}$.

b) Let m be a positive integer such that $\gcd(11, m) = 1$, and $k = d\phi(m) +$

3. Find $11^k \pmod{m}$

QUESTION 2. 1) Can we have a simple bipartite graph with exactly 9 edges? Give me such graph.

2) Is it possible to have graph G with 5 edges such that \overline{G} also have 5 edges? Explain (note that \overline{G} is the complement of G).

3) Is C_{14} a bipartite graph? if yes Explain

4) Find the adjacency matrix A for $K_{2,3}$. Without finding A^2 , can you give me the entry in A^2 that is in the the second row and fourth column. What is the meaning of such number?

5) Does $K_{2,5}$ have an Euler path? explain

6) For what values of n, m does $K_{n,m}$ have an Euler circuit.

7) Is Q_5 a bipartite graph? Explain

8) Let $S = \{1 < a < 15 \mid \gcd(a, 15) \neq 1\}$ be the set of vertices of a graph. Two vertices a, b in S are connected by an edge iff $ab \pmod{15} = 0$. Draw such graph. what is the degree of each Vertex? Is the graph complete? Is the graph a bipartite graph? Explain.

9) Draw a connected simple planar graph with 8 edges and 5 vertices. This graph partition your piece of paper into how many regions.

10) Draw a graph with the following adjacency matrix $A = \begin{bmatrix} 2 & 2 & 3 & 1 \\ 2 & 0 & 4 & 0 \\ 3 & 4 & 1 & 1 \\ 1 & 0 & 1 & 1 \end{bmatrix}$

Find the Third Column of A^2 and then explain the meaning of these numbers.

QUESTION 3. let $\{a_n\}_{n=0}^{\infty}$ be a sequence such that $a_0 = 1$ and $a_1 = 6$ and $a_n = c_1 a_{n-1} + c_2 a_{n-2}$. If $C(x) = x^2 - 8x + 12$. Find c_1, c_2 . Find a mathematical equation of a_n .

QUESTION 4. Let Given $a_0 = -6, a_1 = 12$, and $a_n = 10a_{n-1} - 25a_{n-2}$. Find a mathematical equation for a_n . Find a_{22} .