

NAME: _____

1. Prove that:

$$\sum_{i=0}^n 17^i = \frac{17^{n+1} - 1}{16}$$

2. Multiply the following matrices.

$$\begin{pmatrix} 0 & 2 & 1 \\ 2 & 0 & 5 \\ 3 & 2 & 1 \end{pmatrix} \begin{pmatrix} 2 & 1 \\ 4 & 0 \\ 2 & 3 \end{pmatrix}$$

3. Convert the following numbers from binary to hexadecimal.

1101011101011000101

001111001

1010101000111010100111101

4. Which of the following are propositions? (If it's a proposition, write YES in the blank otherwise write NO.)

_____ a. If $2=3$ then $3=4$

_____ b. Are you watching TV?

_____ c. A is bigger than B but smaller than C.

_____ d. Study, Study, Study!

_____ e. I wanted to go to the movies, but it was raining.

_____ f. There are more corners in an octagon than there are in a circle.

_____ g. Most people have one leg much longer than the other.

_____ h. I want that new potato peeler is red but never been up.

_____ i. Climb into the frame!

_____ j. One of these days they'll make a penny that's worth more than a dollar.

5. I draw one card from a deck. What are the probabilities of the following events.
- The card is black.
 - The card is an ace.
 - The card is the queen of spades.
 - The card is either black or a king.

6. Define the following terms with respect to graphs.
- Bipartite Graph
 - Path
 - Simple Cycle
 - Adjacent vertices

7. I draw three cards from a deck. What is the probability of getting three kings? (Think carefully about this one before you answer it.)

8. In the polynomial $(x+1)^{21}$, what is the coefficient of x^2 ?

9. What is an Euler Path? How can I tell whether a graph has an Euler Path?

10. In the list of all permutations of the digits 1,2,3,4,5,6, what follows 561243? In the list of all combinations of four digits from the set $\{1,2,3,4,5,6,7\}$, what follows 3678?