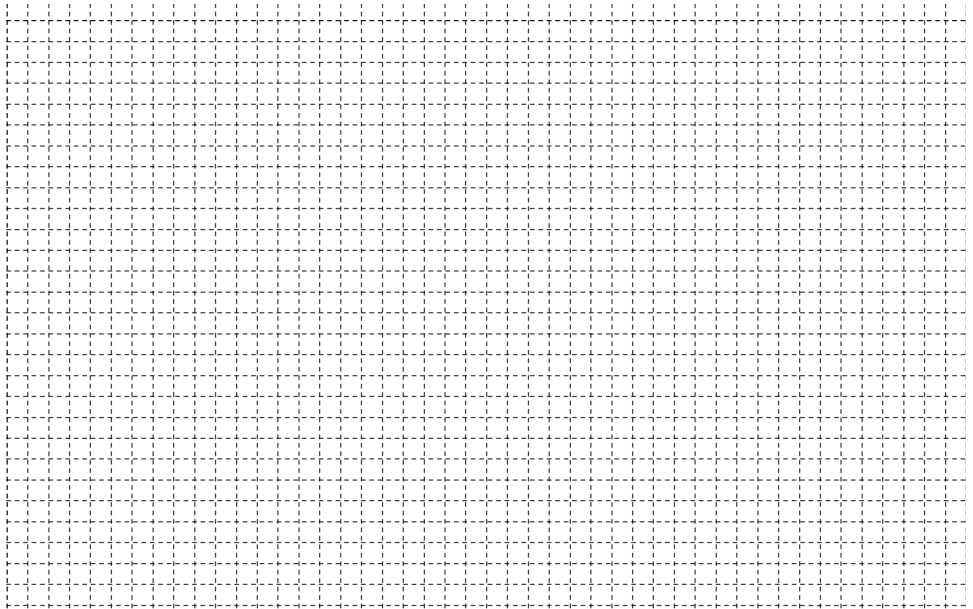


**Problem Solving #5**  
**Advanced Math**  
**Due May Friday May 14<sup>th</sup>**

1. How many different ways are there to arrange the letters in the word MINNESOTA?
  
  
  
  
  
  
  
  
  
  
2. In a hyperbola, the length of the conjugate axis is 10 units, and the vertices are at (1,-1) and (1,5). Determine the equation of the hyperbola. Use the graph if necessary.



3. State the period, phase shift, vertical shift, and amplitude of the graph  
 $f(\theta) = 4\sin(2\theta - 90^\circ) + 1$

Amplitude:

Vertical Shift:

Phase Shift:

Period:

4. Find the  $\lim_{x \rightarrow \infty} \frac{2x - 7}{3x + 4}$
5. Prove that  $\frac{1 + \tan x}{\sin x + \cos x} = \sec x$  is an identity. You may not manipulate both sides of the equation simultaneously. (For example, you may not cross multiply)
6. You are planning on purchasing a car and need to secure a loan for \$9,000. You plan to repay the loan over a 4 year period. If the interest rate is at 6%, determine your monthly payment amount.
7. Determine the value of  $(3 - 3\sqrt{3}i)^{12}$ . State your answer in polar format as well as rectangular.