|  |  |  |
| --- | --- | --- |
| **#0 Alpha Ciphering****FAMAT State Convention 2021** |  | **#0 Alpha Ciphering****FAMAT State Convention 2021** |
| What is the period of the function? |  | What is the period of the function? |
|  |  |  |
| **#0 Alpha Ciphering****FAMAT State Convention 2021** |  | **#0 Alpha Ciphering****FAMAT State Convention 2021** |
| What is the period of the function? |  | What is the period of the function? |
| **#1 Alpha Ciphering****FAMAT State Convention 2021** |  | **#1 Alpha Ciphering****FAMAT State Convention 2021** |
| Find all the values of k such that the equation: , has no solution for x. |  | Find all the values of k such that the equation: , has no solution for x. |
|  |  |  |
| **#1 Alpha Ciphering****FAMAT State Convention 2021** |  | **#1 Alpha Ciphering****FAMAT State Convention 2021** |
| Find all the values of k such that the equation: , has no solution for x. |  | Find all the values of k such that the equation: , has no solution for x. |
| **#2 Alpha Ciphering****FAMAT State Convention 2021** |  | **#2 Alpha Ciphering****FAMAT State Convention 2021** |
| Point F is on sideof triangle ZLU. If the measure of angles UZF and FZL both equal 60 degrees, ZU=3, and ZL=6, then what is the length of ? |  | Point F is on sideof triangle ZLU. If the measure of angles UZF and FZL both equal 60 degrees, ZU=3, and ZL=6, then what is the length of ? |
|  |  |  |
| **#2 Alpha Ciphering****FAMAT State Convention 2021** |  | **#2 Alpha Ciphering****FAMAT State Convention 2021** |
| Point F is on sideof triangle ZLU. If the measure of angles UZF and FZL both equal 60 degrees, ZU=3, and ZL=6, then what is the length of ? |  | Point F is on sideof triangle ZLU. If the measure of angles UZF and FZL both equal 60 degrees, ZU=3, and ZL=6, then what is the length of ? |
| **#3 Alpha Ciphering****FAMAT State Convention 2021** |  | **#3 Alpha Ciphering****FAMAT State Convention 2021** |
| =? |  | =? |
|  |  |  |
| **#3 Alpha Ciphering****FAMAT State Convention 2021** |  | **#3 Alpha Ciphering****FAMAT State Convention 2021** |
| =? |  | =? |
| **#4 Alpha Ciphering****FAMAT State Convention 2021** |  | **#4 Alpha Ciphering****FAMAT State Convention 2021** |
| Given the system: What does MU=? |  | Given the system: What does MU=? |
|  |  |  |
| **#4 Alpha Ciphering****FAMAT State Convention 2021** |  | **#4 Alpha Ciphering****FAMAT State Convention 2021** |
| Given the system: What does MU=? |  | Given the system: What does MU=? |
| **#5 Alpha Ciphering****FAMAT State Convention 2021** |  | **#5 Alpha Ciphering****FAMAT State Convention 2021** |
|  and f(1)=41. What other positive integer k makes f(k) prime? Hint-Factor! |  |  and f(1)=41. What other positive integer k makes f(k) prime? Hint-Factor! |
|  |  |  |
| **#5 Alpha Ciphering****FAMAT State Convention 2021** |  | **#5 Alpha Ciphering****FAMAT State Convention 2021** |
|  and f(1)=41. What other positive integer k makes f(k) prime? Hint-Factor! |  |  and f(1)=41. What other positive integer k makes f(k) prime? Hint-Factor! |
| **#6 Alpha Ciphering****FAMAT State Convention 2021** |  | **#6 Alpha Ciphering****FAMAT State Convention 2021** |
| You are given the sequence, where every third term is negative, and the absolute value of the terms form an arithmetic sequence. What is the sum of the first 303 terms? |  | You are given the sequence, where every third term is negative, and the absolute value of the terms form an arithmetic sequence. What is the sum of the first 303 terms? |
|  |  |  |
| **#6 Alpha Ciphering****FAMAT State Convention 2021** |  | **#6 Alpha Ciphering****FAMAT State Convention 2021** |
| You are given the sequence, where every third term is negative, and the absolute value of the terms form an arithmetic sequence. What is the sum of the first 303 terms? |  | You are given the sequence, where every third term is negative, and the absolute value of the terms form an arithmetic sequence. What is the sum of the first 303 terms? |
| **#7 Alpha Ciphering****FAMAT State Convention 2021** |  | **#7 Alpha Ciphering****FAMAT State Convention 2021** |
| Beavis flips 5 fair coins and his friend(Snowman) flips 2 fair coins. What is the probability that Snowman has more heads showing than Beavis? |  | Beavis flips 5 fair coins and his friend(Snowman) flips 2 fair coins. What is the probability that Snowman has more heads showing than Beavis? |
|  |  |  |
| **#7 Alpha Ciphering****FAMAT State Convention 2021** |  | **#7 Alpha Ciphering****FAMAT State Convention 2021** |
| Beavis flips 5 fair coins and his friend(Snowman) flips 2 fair coins. What is the probability that Snowman has more heads showing than Beavis? |  | Beavis flips 5 fair coins and his friend(Snowman) flips 2 fair coins. What is the probability that Snowman has more heads showing than Beavis? |
| **#8 Alpha Ciphering****FAMAT State Convention 2021** |  | **#8 Alpha Ciphering****FAMAT State Convention 2021** |
| Find the number of positive integers greater than 1 whose fourth powers are factors of 11! |  | Find the number of positive integers greater than 1 whose fourth powers are factors of 11! |
|  |  |  |
| **#8 Alpha Ciphering****FAMAT State Convention 2021** |  | **#8 Alpha Ciphering****FAMAT State Convention 2021** |
| Find the number of positive integers greater than 1 whose fourth powers are factors of 11! |  | Find the number of positive integers greater than 1 whose fourth powers are factors of 11! |
| **#9 Alpha Ciphering****FAMAT State Convention 2021** |  | **#9 Alpha Ciphering****FAMAT State Convention 2021** |
| In the complex plane, a square is centered at the origin with side length . The sides of the square are parallel to the coordinate axes with verticesand.What does=? |  | In the complex plane, a square is centered at the origin with side length . The sides of the square are parallel to the coordinate axes with verticesand.What does=? |
|  |  |  |
| **#9 Alpha Ciphering****FAMAT State Convention 2021** |  | **#9 Alpha Ciphering****FAMAT State Convention 2021** |
| In the complex plane, a square is centered at the origin with side length . The sides of the square are parallel to the coordinate axes with verticesand.What does=? |  | In the complex plane, a square is centered at the origin with side length . The sides of the square are parallel to the coordinate axes with verticesand.What does=? |
| **#10 Alpha Ciphering****FAMAT State Convention 2021** |  | **#10 Alpha Ciphering****FAMAT State Convention 2021** |
| What is the area of the triangle formed by the foci and any endpoint of either latus rectum for the following conic?  |  | What is the area of the triangle formed by the foci and any endpoint of either latus rectum for the following conic?  |
|  |  |  |
| **#10 Alpha Ciphering****FAMAT State Convention 2021** |  | **#10 Alpha Ciphering****FAMAT State Convention 2021** |
| What is the area of the triangle formed by the foci and any endpoint of either latus rectum for the following conic?  |  | What is the area of the triangle formed by the foci and any endpoint of either latus rectum for the following conic?  |