Speed Math

Test #342/361

Name: _____

ID Number: _____

School: _____

Division (circle one):

Mu   Alpha   Theta   Sponsor

_____ 1.   Evaluate: $(3-6)^2$

_____ 2.   What is the units' digit of $2^{2^{2^{2016}}}$?

_____ 3.   Simplify for positive a:

$\log_{a^6} \sqrt[3]{a}$

_____ 4.   Simplify: $\dfrac{2017!}{2014! \cdot 2016}$

_____ 5.   Evaluate the expression when $x = -1$:

$-3x^5 + 3x^4 - 9x^3 + x^2 + 2x + 5$

_____ 6.   Evaluate: $\begin{vmatrix} 1 & 0 & 2 & -1 \\ -1 & 0 & 0 & 0 \\ 2 & 2 & 0 & 2 \\ -2 & 1 & -1 & 0 \end{vmatrix}$

_____ 7.   Find the sum of the 673 least positive integers.

_____ 8.   How many two-digit numbers contain at least one four?

_____ 9.   Find the volume, in cubic feet, of a cylinder with a radius of length 1 yard and height of 6 inches.

_____ 10.   Find the value of $f(2) + f(-2)$ for the function $f(x) = (x^3 - 2)(3x^2)(x+5)$.

_____ 11.   The points $(-1, -8)$, $(2, 4)$, and $(a, 2016)$ are collinear. Find the value of a.

_____ 12.   If $A = (1+i)^{2016}$, find the value of $\log_2 A$.

_____ 13.   A jar containing ten pounds of nuts is made up of 2 pounds of almonds and 8 pounds of cashews. A mixture of almonds and cashews is well-mixed so that any sample from this mixture consists of 80% almonds and 20% cashews by weight. How many pounds of this mixture should be added to the jar so that the jar is now 75% almonds by weight?

_____ 14.   A square encloses an area of 50. What is the circumference of a circle that circumscribes this square?

_____ 15.   The measures of the three interior angles of a triangle are in the ratio 3:3:9. Find the number of degrees in the supplement of the largest angle.

_____ 16.   Find the 16th term in the sequence whose first term is 6, and any term after the first term is the sum of the previous term and the previous term's position in the sequence.

_____ 17.   A pair of distinct positive integers form an "amicable pair" if the sum of the proper positive integral divisors of each integer in the pair is equal to the other integer in the pair. Find the two numbers in the amicable pair whose sum is least.

_____ 18.   Find the sum of the solutions to the equation $\sqrt{2x^2 - 7} = 3 - x$.

_____ 19.   Call a triangle "almost equilateral" if two of its sides are equal in length while the third side differs in length from either of the first two sides by no more than 1. How many almost equilateral triangles exist with integral side lengths, integral enclosed area, and perimeter less than 100?

_____ 20.   Find the equation, in slope-intercept form, for the line passing through the point $(2, 3)$ that has slope $-\dfrac{1}{2}$.

_____ 21.   Solve: $10x + 9 < 7x + 12 < 8x + 18$

_____ 22.   Chocolate chip cookies are $3 each while snickerdoodles are $2.50 each. If 24 total cookies (chocolate chip cookies and snickerdoodles) were sold for $62, how many chocolate chip cookies were sold?

_____ 23.   Evaluate: $\dfrac{_{2016}P_6}{_{2016}C_6}$

_____ 24.   Find the product of the solutions x in the equation $12(1-5x)^2 - 17|1-5x| = -6$.

_____ 25.   Find the volume of a sphere with a diameter of 24.