You have 45 minutes for 15 questions–10 points are given for a correct answer, 4 for a blank answer, and 0 for a wrong answer. Enjoy!

1. Find the units digit of the sum $1^5 + 2^5 + 3^5 + 4^5 + 5^5 + \cdots + 2005^5$.
   
   (A) 1  (B) 3  (C) 5  (D) 7  (E) 9

2. How many sides does a convex polygon have if the sum of its interior angles equals $2700^\circ$?
   
   (A) 13  (B) 14  (C) 15  (D) 16  (E) 17

3. Let $x$ equal the sum of the 6 distinct prime factors of $2^{24} - 1$. What is $x$?
   
   (A) 286  (B) 289  (C) 4125  (D) 4128  (E) 12319

4. What is the sum of the coefficients of the expanded form of $(x + 2y)^4$?
   
   (A) 0  (B) 1  (C) 16  (D) 81  (E) 625

5. The sides of a triangle with positive area have lengths 4, 6, and $x$. The sides of a second triangle with positive area have lengths 4, 6, and $y$. What is the smallest positive number that is not a possible value of $|x - y|$?
   
   (A) 2  (B) 4  (C) 6  (D) 8  (E) 10

6. What is $x^3$ if $\frac{2}{x} = \frac{y}{3} = \frac{x}{y}$?
   
   (A) 6  (B) 12  (C) 24  (D) 216  (E) None of the Above

7. Consider the sequence $1, -2, 3, -4, 5, -6, \ldots$ where $n$-th term is $(-1)^{n+1} \cdot n$. What is the average of the first 200 terms of the sequence?
   
   (A) −1  (B) −0.5  (C) 0  (D) 0.5  (E) 1

8. For how many integers $n$ between 1 and 100 does $x^2 + x - n$ factor into the product of two linear factors with integer coefficients?
   
   (A) 0  (B) 1  (C) 2  (D) 9  (E) 10

9. Team $A$ and Team $B$ play a best of 7 series. Team $A$ has a $\frac{3}{4}$ probability of beating Team $B$ in each game. What is the probability that the series goes to the 7-th game?
   
   (A) $\frac{405}{2048}$  (B) $\frac{135}{512}$  (C) $\frac{135}{1024}$  (D) $\frac{1}{7}$  (E) $\frac{135}{2048}$

10. If $\sin x = 3 \cos x$, then what is the value of $\sin x \cos x$?
    
    (A) $\frac{1}{6}$  (B) $\frac{1}{5}$  (C) $\frac{2}{5}$  (D) $\frac{1}{4}$  (E) $\frac{3}{10}$
11. What is the number of distinct solutions \((x, y, z)\) to the equation \(x^2 + yz = y^2 + xz\) if \(x, y,\) and \(z\) are integers between 1 and 5 inclusive?

(A) 6  (B) 8  (C) 25  (D) 31  (E) 37

12. Two parallel chords in a circle have lengths 6 and 8. The distance between them is 1. What is the diameter of the circle?

(A) 9  (B) 10  (C) 12  (D) 14  (E) \(10\sqrt{3}\)

13. How many positive odd integers with middle digit 5 and no digit repeated are there between 10,000 and 69,999?

(A) 756  (B) 1,008  (C) 1,680  (D) 10,000  (E) None of the Above

14. For certain integers \(n\), the expression \(n^2 - 3n - 126\) is a perfect square. What is the sum of all distinct possible values of \(n\)?

(A) \(-118\)  (B) \(-12\)  (C) \(-1\)  (D) 12  (E) 22

15. Simplify \(\sqrt[3]{2} + \sqrt{5} + \sqrt[3]{2} - \sqrt{5}\).

(A) \(\sqrt{5} - 1\)  (B) 1  (C) \(\sqrt{2}\)  (D) \(\sqrt{5} - \sqrt{2}\)  (E) \(\frac{6}{5}\)