1. What is the last digit of $2013^{2013}$?
   a. 3  b. 1  b.c. 9  d. 7  e. None of these.

2. What is the area of a circle inscribed in an equilateral triangle of side length 1?
   a. $\frac{\pi}{9}$  b. $\frac{\pi}{6}$  c. $\frac{\pi}{4}$  d. $\frac{\pi}{12}$  e. None of these.

3. The greatest common factor between $2^{2013} - 1$ and $2^{2013} + 1$ is
   a. 2  b. 2013  c. 3  d. 4  e. None of these.

4. What day of the week will it be 100 days from now?
   a. Friday  b. Sunday  c. Wednesday  d. Saturday  e. None of these.

5. How many positive integers (including 1 and $2013^9$) evenly divide $2013^9$?
   a. 1000  b. 10000  c. 2013  d. 503  e. None of these.

6. If $\sin x + \cos x = 1$, then $\sin 2x =$
   a. 1  b. $-1$  c. $\frac{1}{\sqrt{2}}$  d. 0  e. None of these.

7. If a fair coin is flipped 10 times the probability of getting 5 heads and 5 tails is
   a. $\frac{1}{2^{10}}$  b. $\frac{10!}{2^{10}}$  c. $\frac{1}{2}$  d. $\frac{63}{2^{10}}$  e. None of these.

8. Evaluate
   $$\frac{1}{1 \cdot 2} + \frac{1}{2 \cdot 3} + \frac{1}{3 \cdot 4} + \cdots + \frac{1}{2012 \cdot 2013}.$$
   a. $\frac{2012}{2013}$  b. $\frac{2013}{2012}$  c. $\frac{537}{612}$  d. $\frac{1}{2}$  e. None of these.

9. Which one of the following numbers is nearest in value to the quantity $\sqrt{101} - 10$?
   a. $\frac{1}{16}$  b. $\frac{1}{20}$  c. $\frac{1}{18}$  d. $\frac{1}{22}$  e. None of these.
10. If \(a, b, c\) are the roots of \(x^3 - 6x - 2 = 0\) then \(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\) is
   a. 3     b. 0     c. -3,     d. 2     e. None of these.

11. Three fair die are thrown. What is the probability that the sum of the three numbers will be 9?
   a. \(\frac{1}{2}\)     b. \(\frac{29}{216}\)     c. \(\frac{25}{216}\)     d. \(\frac{1}{16}\)     e. None of these.

12. \(ABCD\) is a square, and \(ABF\) is an equilateral triangle where \(F\) is outside the square \(ABCD\). The measure of \(\angle ADE\) in degree is
   a. 10     b. 15     c. 30     d. 20     e. None of these.

13. \(\frac{(m^{-2} - n^{-2})^{-1}}{(m^{-1} - n^{-1})^{-1}} = \)
   a. \(\frac{m + n}{mn}\)     b. \((m + n)^2\)     c. \(\frac{1}{m + n}\)     d. \(m + n\)     e. None of these.

14. Find a positive integer \(n\) such that
   \[
   \frac{1 + 3 + 5 + \cdots + (2n - 1)}{2 + 4 + 6 + \cdots + 2n} = \frac{115}{116}
   \]
   a. 117     b. 231     c. 115     d. There is no such \(n\)     e. None of these.

15. What is the area of the largest hexagon that can be fit into a square of side length 1?
   a. \(\frac{1}{2}\)     b. \(\frac{1}{\sqrt{3}}\)     c. \(\frac{1}{3}\)     d. \(\frac{1}{\sqrt{2}}\)     e. None of these.

16. Let
   \[
   N = \frac{\sqrt{\sqrt{5} + 2 + \sqrt{5} - 2}}{\sqrt{\sqrt{5} + 1}} - \sqrt{3 - 2\sqrt{2}}
   \]
   Then \(N\) is
   a. \(2\sqrt{2} - 1\)     b. 1     c. \(\sqrt{\frac{5}{2}}\)     d. \(\sqrt{\frac{5}{2}}\)     e. None of these.

17. What is the value of the following product?
   \[
   \left(1 - \frac{1}{2^2}\right)\left(1 - \frac{1}{3^2}\right)\left(1 - \frac{1}{4^2}\right)\cdots\left(1 - \frac{1}{2013^2}\right)
   \]
   a. \(\frac{2015}{4026}\)     b. \(\frac{1}{2}\)     c. \(\frac{2006}{2013}\)     d. \(\frac{1007}{2013}\)     e. None of these.
18. Which of the following numbers below is a solution to the following equation?

\[ \sqrt{3} - x + \sqrt{3} + x = x \]

a. \( 2\sqrt{2} \)  
b. \( \sqrt{6} \)  
c. \( \sqrt{6} + \sqrt{2} \)  
d. \( 3\sqrt{3} \)  
e. None of these.

19. \( \log_3 \frac{9\sqrt{27}}{81^2} = \)

a. \( -\frac{9}{2} \)  
b. \( \frac{2}{9} \)  
c. 4  
d. \( \frac{2}{3} \)  
e. None of these.

20. Jane is now twice as old as Bob, but seven years ago she was three times as old as him. How old will Jane be when she is one and half times as old as Bob?

a. 40  
b. 30  
c. 50  
d. 42  
e. None of these.

21. How many integers \( x \) between 1 and 100 are there such that \( x^3 + 4x + 2 \) is divisible by 7?

a. 26  
b. 27  
c. 28  
d. 29  
e. None of these.

22. \( \log_2(\log_2(\log_2(\log_2 16))) = \)

a. 1  
b. 0  
c. 3  
d. 2  
e. None of these.

23. \[ \frac{1 + \frac{1}{1 + \frac{1}{1 + 2}}} = \]

a. \( \frac{4}{7} \)  
b. \( \frac{7}{4} \)  
c. \( \frac{2}{5} \)  
d. \( \frac{3}{2} \)  
e. None of these.

24. Triangle \( ABC \) is such that \( AB = 4 \) and \( AC = 8 \). If \( M \) is the midpoint of \( BC \) and \( AM = 3 \), what is the length of \( BC \)?

a. \( 2\sqrt{26} \)  
b. 9  
c. \( 2\sqrt{31} \)  
d. There is not enough information to determine the answer.  
e. None of these.

25. What is the remainder when \( x^{2013} + 2013 \) is divided by \( x + 1 \)?

a. 2012  
b. 2014  
c. 0  
d. 2013  
e. None of these.