1-1. Solve $2^6 = 16^x$

1-2. Let $T = TNYWR$. Regular hexagon ABCDEF has area $T$. What is the area of triangle ACE?

1-3. Let $T = TNYWR$. A regular hexagon is inscribed in a circle of radius $T$. Six semi-circles are drawn exterior to the hexagon such that each edge of the hexagon is a diameter of a semi-circle. What is the area of the “flower pattern” formed by the union of the hexagon and the six semi-circles?
2-1 Compute: \( \log 4^{25} + \log 5^{4^3} \)

2-2 Let \( T = \text{TNYWR} \). The point \((32, T)\) is on a square whose four vertices are on the axes. If the side of the square equals \( b\sqrt{2} \), compute \( b \).

2-3 Let \( T = \text{TNYWR} \). Let \( R = T/4 \). For a certain value of \( n \), the expressions \( 3n^2 + 4n - R \) and \( 2n^2 + 3n - R + 56 \) equal the same prime number \( p \). What is \( p \)?
RELAY – NOV 2019, STL

1-1. Solve $2^{16} = 16^x$

1-2. Let $T = TNYWR$. Regular hexagon ABCDEF has area T. What is the area of triangle ACE?

1-3. Let $T = TNYWR$. A regular hexagon is inscribed in a circle of radius T. Six semi-circles are drawn exterior to the hexagon such that each edge of the hexagon is a diameter of a semi-circle. What is the area of the “flower pattern” formed by the hexagon and the six semi-circles?

ANSWERS:

1-1. $x = 4$  
1-2. $[ACE] = 2$  
1-3. $[flower] = 6\sqrt{3} + 3\pi$

2-1. Compute: $\log 4^{25} + \log 5^{43}$

2-2. Let $T = TNYWR$. The point $(32, T)$ is on a square whose four vertices are on the axes. If the side of the square equals $b\sqrt{2}$, compute $b$.

2-3. Let $T = TNYWR$. Let $R = T/4$. For a certain value of $n$, the expressions $3n^2 + 4n - R$ and $2n^2 + 3n - R + 56$ equal the same prime number $p$. What is $p$?

ANSWERS:

2-1. 64  
2-2. 96  
2-3. 151