1. Give the smallest positive integer $A$ for which the $x$ and $y$ values of the solution to the system
   
   \[ \begin{align*}
   54x - 4y &= 10 \\
   5x + 6y &= A
   \end{align*} \]

   are both positive.

2. An ant starts at $S$ and crawls to $A$, around the large semicircle back to $S$, then around the small semicircle to $B$, and finally back to $S$.

   \[
   \begin{array}{c}
   A \quad S \quad B
   \end{array}
   \]

   What is the total distance traveled by the ant if $AS = \frac{2}{3}(AB)$ and $SB = 4$?

3. A survey showed that
   
   - 84 people like the music of Beethoven only.
   - 34 people like the music of Bach only.
   - 72 people like the music of Berlioz only.
   - A total of 100 people liked only two of the three composers.
   - 85 disliked all three.

   The number of people surveyed is the largest perfect square less than 1000. How many people like the music of all three composers?

4. Let $A = \text{the sum of the } x \text{ and } y \text{ intercepts of the graph of } 5x = 9y + 18$.

   Let $B = \text{the area of quadrilateral } WXYZ$ if $W = (2, 7)$, $X = (7, 7)$, $Y = (3, -2)$ and $Z = (-2, -2)$.

   Find the product $AB$.

5. A regular pentagon and a regular octagon share side $\overline{WT}$ as shown.

   \[
   \begin{array}{c}
   S \\
   T \\
   \end{array}
   \]

   What is the degree measure of the smallest angle of triangle $SRT$?
6. A class contains 5 boys and 5 girls. They select seats at random around a circular table that seats 10. Find the probability that at least two girls will sit next to each other.

7. \[
\frac{1}{s - 1} - 1 = 1 \quad \text{and} \quad \frac{t + 7}{7} = \frac{13}{8}.
\]
Find the value of the product \(st\).

8. Consider all positive integer solutions to \(3x + 4y = 50\). What is the difference between the largest and smallest values of \(x\) that can occur?

9. Give the value of \(A\) where \(2^A = (1 + i)^{200} + (1 - i)^{200}\)

10. A house valued at \$90,000 in 1985 was sold for \$250,000 in 1998. Assuming that the value of the house was modeled during that period of time by the exponential function \(y = ar^t\), give the value of \(r\) to the nearest hundredth.