

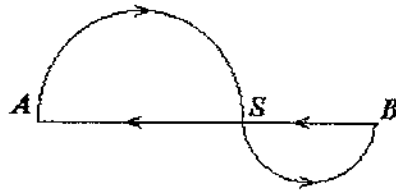
1. Give the smallest positive integer  $A$  for which the  $x$  and  $y$  values of the solution to the system

$$5Ax - 4y = 10$$

$$5x + 6y = A$$

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  $S$ .



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

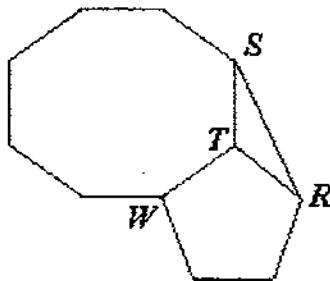
3. A survey showed that  
 84 people like the music of Beethoven only.  
 34 people like the music of Bach only.  
 72 people like the music of Berlioz only.  
 A total of 100 people liked only two of the three composers.  
 85 disliked all three.

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  $A$  = the sum of the  $x$  and  $y$  intercepts of the graph of  $5x = 9y + 18$ .  
 Let  $B$  = 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.



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. 
$$\frac{1}{\frac{1}{\frac{1}{s-1} - 1} - 1} - 1 = 1 \quad \text{and} \quad \frac{t+7}{7} = \frac{13}{8}$$

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  $y = ar^x$ , give the value of  $r$  to the nearest hundredth.

Answers

1. 4  
 2.  $6\pi + 12$   
 3. 586  
 4. 72  
 5. 31.5  
 6.  $121/126$   
 7. 7  
 8. 12  
 9. 101  
 10. 1.08