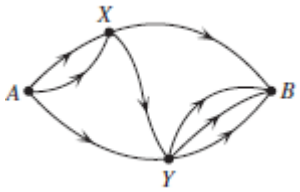
11. In the summation below D=B+C. What is the value of A+B+C+D?

$$\begin{array}{r} 2BA \\ +C6D \\ \hline 8AD \end{array}$$

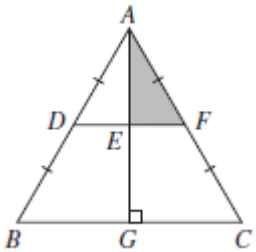
12. What is the smallest whole number N such that $5^N > 4000000$?

13. In how many ways can you walk from Point A to point B if you must walk along the directions marked by arrows?



14. Suppose that when a man is at point A (see the figure for Question 13), the probability that he walks along any of the three paths is $\frac{1}{3}$. If he is at point X the probability that he walks along any of the 2 paths is $\frac{1}{2}$. If he is at point Y, the probability that he walks along any of the three paths is $\frac{1}{3}$. Two men walk independently from point A to point B. What is the probability that both choose the same path?

15. ΔABC is equilateral with side 4. $AD = DB$, and ΔADF is equilateral.
What is the difference between the area of $EFCG$ and ΔAEF ?
Express your answer as $\sqrt{N}$ where N is a positive whole numbers.



16. N, $N+K$, and $N+2K$ are all integers and $K>0$.
$N(N+K)(N+2K)=P$ where P is prime.
What is the value of N?

17. Zake tossed a coin 5 times and got at least one head.
What is the probability that he got exactly 4 heads?
Express your answer as a common fraction in lowest terms.

18. You can use the digits 2, 0, 1, and 5 to form three digit numbers (but only the digit 1 is allowed to be used more than once). How many numbers can be formed? Examples for valid numbers: 111, 101, 251, 502.

19. A regular polygon has 120 sides. How many non congruent regular polygons can be drawn using corners of this polygon as their corners?

20. Yoko is more than 8 years old and is younger than 50.
The sum of all factors of her age is twice her age.
What is her age (in years)? Note that 1 and N are factors of N.

Answers:

Page 3

11. 18
12. 10
13. 11
14. $\frac{1}{9}$
15. $\sqrt{3}$

Page 4

16. -3
17. $\frac{5}{31}$
18. 27
19. 14
20. 28