

2021 AIM Sample Problems

AIM COMMITTEE

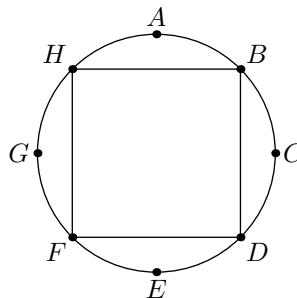
August 20

These are a set of eight sample problems representative of the type of problems that will appear on AIM. Hopefully they're helpful for you to practice for the real competition!

1. What is $1 \times 1 + 2 \times 2 + 3 \times 3 + 4 \times 4 + 5 \times 5 - 6 \times 6$?
2. In a class with 20 students, 12 students like stirfry and 6 students like both stirfry and pizza. If no students like neither stirfry nor pizza, how many students only like pizza?
3. Consider the addition

$$\begin{array}{r} \\ \\ + \\ \hline 1 \end{array}$$

- where different letters represent different digits. What is the largest possible value of the three-digit number \overline{AIM} ?
4. Let $ABCD$ be a square with side length 10. Point E is chosen on segment \overline{BC} such that $EC = 3$, and point F is chosen on segment \overline{CD} such that $FC = 4$. What is the area of triangle AEF ?
 5. Maryam rolls a fair six-sided die to get the number a . She then rolls it again to get a number b . These two digits are joined together to form the two-digit number \overline{ab} . What is the probability that \overline{ab} is prime?
 6. Points $A, B, C, D, E, F, G,$ and H are equally spaced around the circumference of a circle ω . If the area of ω is 120π , what is the area of square $BDFH$?



7. Evaluate $1 + \frac{1}{2} - \frac{1}{4} + \frac{1}{8} + \frac{1}{16} - \frac{1}{32} + \frac{1}{64} + \frac{1}{128} - \frac{1}{256} + \dots$.
8. Let x be the fifth smallest positive integer such that $x^3 + 6^3$ is divisible by 5. Compute $\frac{x^3 + 6^3}{5}$.