

Week 3: Pre-AMC Level

Problem 1 There are 8 consecutive integers. If the sum of the first three is 63, what is the largest one?

- (A) 17 (B) 25 (C) 27 (D) 30 (E) 31

Problem 2 Joshua is 10 years old and his father is 42 years old. After how many years, his father's age is three times Joshua's age?

- (A) 5 (B) 6 (C) 7 (D) 8 (E) 9

Problem 3 N is a 7-digit number consists of 2 or 3. There are more 2s than 3s in N . If N is divisible by both 3 or 4, what is the remainder of N when it is divided by 7?

- (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

Problem 4 The preliminary round of a violin competition is divided into four rounds. According to the rule, the average score of a percipient of these four rounds must be not less than 96 points in order to enter the finals. Shaelyn's scores in the first three rounds are 95, 97, and 94. What is the minimum score that she needs to get on the fourth round in order to enter the finals? (Hope Cup Math Competition, China)

- (A) 96 (B) 97 (C) 98 (D) 99 (E) 100

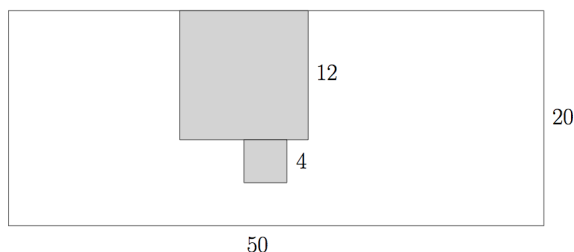
Problem 5 [AMC8 Problem] A haunted house has 8 windows. In how many ways can George the Ghost enter the house by one window and leave by a different window?

- (A) 28 (B) 32 (C) 40 (D) 56 (E) 63

Problem 6 Jackie bought a bottle (30 oz) of 90% alcohol from pharmacy to make homemade disinfectant spray. How many ounces of water should he add in order to dilute it into 75% alcohol? (Hint: The amount of alcohol remains the same.)

- (A) 3 (B) 4 (C) 5 (D) 6 (E) 7

Problem 7 Cut a 12×12 square and a 4×4 square from a 50×20 rectangle paper. What is the perimeter of the remaining part?



- (A) 128 (B) 140 (C) 152 (D) 160 (E) 172

Problem 8 Jasmine keeps adding numbers one by one from the following list

$$1, 3, 5, 7, \dots$$

as $1 + 3 = 4$, $1 + 3 + 5 = 9$, $1 + 3 + 5 + 7 = 16$, etc. At one point, she got 379 and realized that one number is missed in the addition. What is the sum of digits of the missing number?

- (A) 3 (B) 6 (C) 8 (D) 9 (E) 11

Problem 9 $\overline{ab}$ and $\overline{cd}$ are two 2-digit numbers. If

$$\overline{ab} - \overline{cd} = 24$$

and

$$\overline{1ab} - \overline{cd1} = 15,$$

what is $a + d$?

- (A) 5 (B) 8 (C) 10 (D) 11 (E) 12

Problem 10 The speed of a train is 15 meters per second. If it takes the train 10 seconds to pass a lamp post, how long does it take the train to completely pass a 300-meter long tunnel, in seconds? (Hint: first figure out the length of the train based on the information related to the lamppost)

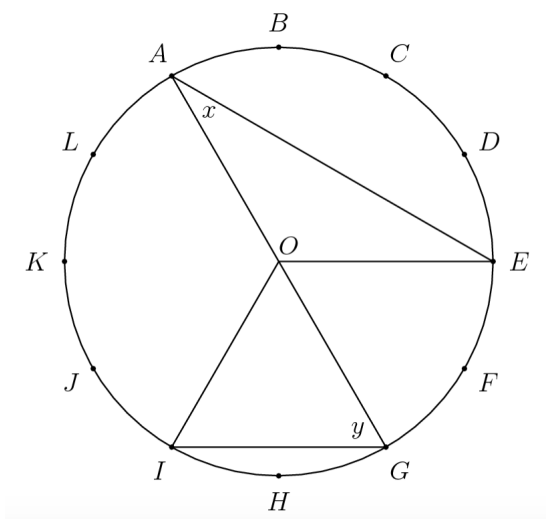
- (A) 10 (B) 20 (C) 25 (D) 30 (E) 35

Problem 11 How many pairs of positive integers (x, y) satisfy that

$$\frac{x}{3} = \frac{4}{y} ?$$

- (A) 3 (B) 4 (C) 5 (D) 6 (E) 7

Problem 12 [AMC8 Problem] The circumference of the circle with center O is divided into 12 equal arcs, marked the letters A through L as seen below. What is the number of degrees in the sum of the angles x and y ?



- (A) 75 (B) 80 (C) 90 (D) 120 (E) 150

Problem 13 If for whole numbers x , y and z ,

$$360 = 2^x \times 3^y \times 5^z,$$

what is $x + y + z$? Here

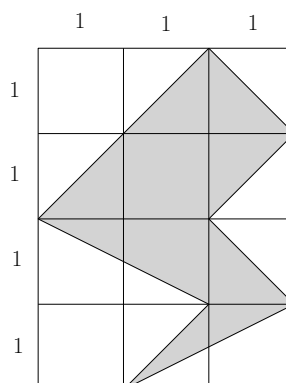
$$a^n = \underbrace{a \times a \times \cdots \times a}_n.$$

For example,

$$100 = 2 \times 2 \times 5 \times 5 = 2^2 \times 5^2.$$

- (A) 5 (B) 6 (C) 7 (D) 8 (E) 9

Problem 14 What is the area of the shaded region in the following 3×4 grid?



- (A) 5 (B) 6 (C) 7 (D) 8 (E) 9

Problem 15 Randomly choose 3 different numbers from the set

$$\{1, 3, 5, 7, 9\}.$$

What is the probability that three selected numbers could be side lengths of a triangle?

- (A) $\frac{1}{5}$ (B) $\frac{3}{10}$ (C) $\frac{1}{3}$ (D) $\frac{2}{5}$ (E) $\frac{1}{2}$

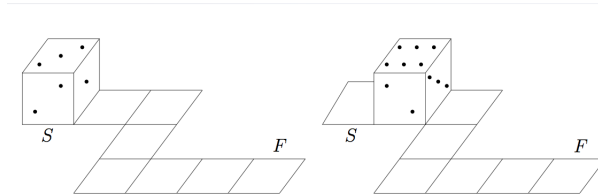
Problem 16 [AMC 10 Problem] Marley practices exactly one sport each day of the week. She runs three days a week but never on two consecutive days. On Monday she plays basketball and two days later golf. She swims and plays tennis, but she never plays tennis the day after running or swimming. Which day of the week does Marley swim?

- (A) *Sunday* (B) *Tuesday* (C) *Thursday* (D) *Friday*
(E) *Saturday*

Problem 17 Three toy cars run around a round track. It takes them 8, 10 and 12 seconds to finish one full circle respectively. If three cars starts together from the same point and run toward the same direction, after how many seconds will they get back to the starting point together for the first time?

- (A) 20 (B) 40 (C) 60 (D) 80 (E) 120

Problem 18 Opposite faces of a die always add to 7. A die rolls on a circuit as represented below. At the starting point (S) the top face is 3. Which will be the top face at the final point (F)?



- (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

Problem 19 How many numbers x satisfy that

$$(x^2 - 2)^2 = 4 ?$$

- (A) 0 (B) 1 (C) 2 (D) 3 (E) 4

Problem 20 Jeni has 5 different colors of candies (blue, green, orange, red and white). Each color has at least 4 candies. One day, she wants to choose 7 candies to put in a bag for her friends in the school. If every color has to be included in her candy bag, how many different combinations does she have? Here candies with the same color are considered to be identical.

- (A) 5 (B) 10 (C) 15 (D) 18 (E) 20

Answers

1. C 2. B
3. E (Hint: Recall divisibility tests for 3 (sum of digits is divisible by 3) and 4 (the last two digits as a two-digit number is divisible by 4))
4. C
5. D (Hint: Use multiplication principle. 8 choices for the entering window and then 7 choices for the exiting window.)
6. D 7. E
8. A (Hint: $4 = 2^2$, $9 = 3^2$, $16 = 4^2$,...)
9. A 10. D
11. D
12. C (Hint: What are $\angle AOE$ and $\angle IOG$?)
13. B 14. A 15. B
16. E
17. E (Hint: This problem is basically asking the least common multiple (lcm) of 8, 10 and 12)
18. E
19. D (Hint: Do not forget negative numbers. For example, $n^2 = 4$ implies that $n = 2$ or $n = -2$)
20. C