

1. A container contains three types of candies; Chocolate Candy, Sour Candy, and Fruit Candy. There are 5 chocolate candies, 6 sour candies, and $10 - x$ fruit candies.

If the probability of picking a chocolate or sour candies at random is 0.55, what is the value of x ?

- A) 3
- B) 2
- C) 1
- D) 4

(Correct +3, Wrong 0, Blank 0)

2. Given the following equation

$$x + xy + y = 18$$

where x and y are integers.

Determine the maximum value of xy .

- A) 25
- B) 20
- C) 0
- D) 40

(Correct +3, Wrong 0, Blank 0)

3. The remainder when

$$1! + 2! + \dots + 75!$$

divided by 10 is ____.

- A) 4
- B) 2
- C) 1
- D) 3

(Correct +3, Wrong 0, Blank 0)

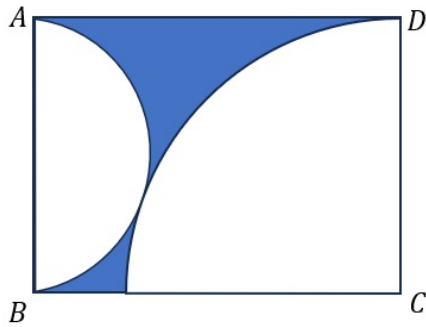
4. Given an arithmetic sequence $a_1, a_2, a_3, \dots$

If a_1, a_3, a_9 form a geometric sequence, determine the value of $\frac{a_5}{a_2}$ ($a_2 \neq 0$).

- A) $\frac{5}{2}$
- B) $\frac{9}{2}$
- C) $\frac{3}{2}$
- D) $\frac{2}{5}$

(Correct +3, Wrong 0, Blank 0)

5. Consider the following two dimensional figure below



Given a quadrilateral $ABCD$ with $BC = a$, and two circles inside $ABCD$ that are tangent to each other.

Determine the area of the shaded region.

- A) $\frac{a^2(5\sqrt{2}\pi-4)}{8}$
 B) $\frac{a^2(7-2\pi)}{8}$
 C) $\frac{a^2 5\sqrt{2}\pi}{8}$
 D) $\frac{a^2(4\sqrt{2}-5\pi)}{8}$

(Correct +3, Wrong 0, Blank 0)

6. The number **B53A** is a four-digit number **greater than 3000** and **divisible by 9**.
Find the value of **A + B**.

- A) 9
 B) 8
 C) 10
 D) 7

(Correct +3, Wrong 0, Blank 0)

7. Given a sequence of a real numbers that satisfies the following recursive equation

$$a_{n+1} = \frac{-a_n\sqrt{2} + \sqrt{2026}}{2024a_n + \sqrt{2}}$$

for every natural number n .

If $a_1 = 0$, then determine a_{2026}

- A) $\sqrt{1013}$
 B) 1013
 C) 2026
 D) $\sqrt{2026}$

(Correct +3, Wrong 0, Blank 0)

8. How many triangles can be formed by 21 points, that is 12 points lie on one line and other 9 on another parallel line?

- A) 2026
 B) 1096
 C) 1024
 D) 1026

(Correct +3, Wrong 0, Blank 0)

9. Let f be a function that satisfies the following equation

$$f(n) = f(n+1) - f(n+2)$$

for every integer n .

If $f(1) = 5$ and $f(6) = 120$, determine the value of $f(3)$.

- A) -120
B) 0
C) 120
D) 1

(Correct +3, Wrong 0, Blank 0)

10. If a, b, c are positive real numbers such that $a^2 + b^2 + c^2 = 1$.

Find the minimum value of the expression

$$\frac{a^3}{b+c} + \frac{b^3}{c+a} + \frac{c^3}{a+b}.$$

- A) $\frac{\sqrt{2}}{4}$
B) $\frac{1}{4}$
C) $\frac{\sqrt{2}}{2}$
D) $\frac{1}{2}$

(Correct +3, Wrong 0, Blank 0)

11. Let p and q be any distinct prime numbers, and let $S = \{1, 2, 3, 4, 5, \dots, pq-1\}$.

Determine the number of integers a in S such that $a^2 \equiv 1 \pmod{pq}$.

- A) 3
B) 1
C) 4
D) 2

(Correct +3, Wrong 0, Blank 0)

12. Let a_n be a geometric sequence with common ratio r . If

$$u_{10} + 2u_{12} = 3u_{11}$$

and $a_9 = x$, then determine the value of a_{2026}

- A) $\frac{x^2}{2^{2025}}$
B) $\frac{x}{2^{2017}}$
C) $\frac{x}{2^{2025}}$
D) x^{2026}

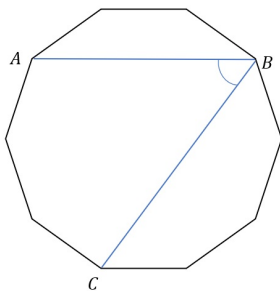
(Correct +3, Wrong 0, Blank 0)

13. A square wire is reshaped into a circle without changing its total length. If the side length of the original square is s , what is the ratio of the area of the new circle to the area of the original square?

A) $\pi : 1$
 B) $\pi : 16$
 C) $\pi : 4$
 D) $1 : \pi$

(Correct +3, Wrong 0, Blank 0)

14. Consider the following regular decagon below



Determine the value of $\angle ABC$.

A) 64°
 B) 70°
 C) 54°
 D) 60°

(Correct +3, Wrong 0, Blank 0)

15. A planar (no edge intersects except at vertices) connected graph G has V vertices, E edges, and F faces (interior and exterior regions). Given that each vertex has degree 3 and each face is bounded by exactly 4 edges.

Calculate the number of edges E in the graph G .

A) 18
 B) 12
 C) 30
 D) 24

(Correct +3, Wrong 0, Blank 0)

16. The numbers of solutions to the equation

$$\sin(t) + \cos(t) = \sin^2(t) + \cos^2(t) \text{ for } 0 \leq t \leq \pi \text{ was } \sqrt{k}$$

the value of $k^2 + 2$ is?

A) 6
 B) 8
 C) 7
 D) 5

(Correct +3, Wrong 0, Blank 0)

17. if x, y and z are real numbers that satisfy
 $x + y + z = 12$ and $xy + yz + zx = 41$

then the value of $\frac{x^2+y^2+z^2}{2}$ is?

- A) 28
 B) 30
 C) 31
 D) 29

(Correct +3, Wrong 0, Blank 0)

18. A teacher wants to distribute **20** identical marbles to **3** students, namely Adi, Budi, and Candra, with the condition that each student receives at least **2** marbles, but Budi must not receive more than **8** marbles.

In how many different ways can the marbles be distributed?

- A) 91
 B) 96
 C) 84
 D) 105

(Correct +3, Wrong 0, Blank 0)

19. A group of surveyor conducts a survey on the body fat percentage of it's member. The average body fat percentage of 14 members is 39.75%

If added one more person, what is the body fat percentage the 15th person has so the average is 41%?

- A) 55.75%
 B) 50.2%
 C) 58.5%
 D) 47.9%

(Correct +3, Wrong 0, Blank 0)

20. Three identical solid spheres, each of radius R , are placed close together horizontally so that they touch each other. A solid cone is then placed on top of the three spheres so that the circumference of the base of the cone touches the sphere at its highest point.

If the height of the cone is R , find the ratio of the volume of the cone to the total volume of the three spheres.

- A) $\frac{1}{9}$
 B) $\frac{\sqrt{3}}{4}$
 C) $\frac{1}{12}$
 D) $\frac{1}{4}$

(Correct +3, Wrong 0, Blank 0)

21. A number is called **"Komo"** if it satisfies the following four conditions:
1. A "Komo" number has **4 digits**.
 2. The **sum of all its digits** is **10**. (For example, 2026 is a "Komo.")
 3. A "Komo" number **cannot start with an odd prime digit**
 4. **"Komo"** number allowed repetition of digits.
How many "Komo" numbers are there?

(Correct +4, Wrong 0, Blank 0)

22. A convex polygon P has 45 more diagonals than a convex polygon Q .

If polygon P has twice as many sides as polygon Q , **how many diagonals does polygon P have?**

(Correct +4, Wrong 0, Blank 0)

23. The results of:
 $\cos^2 20^\circ + \cos^2 40^\circ + \cos^2 60^\circ + \cos^2 80^\circ$
 is denoted as $\frac{a}{a-3}$. **The value of a^2 is?**

(Correct +4, Wrong 0, Blank 0)

24. Given a function $f : \mathbb{R} \rightarrow \mathbb{R}$ that satisfies the functional equation
 $f(x+y) = f(x) + f(y) + 3xy$ for all real numbers x and y .

If $f(1) = 5$, determine the value of $f(10)$.

(Correct +4, Wrong 0, Blank 0)

25. Let a and b be rational number such that

$$2 + \frac{1}{2 + \frac{1}{2 + \frac{1}{2 + \dots}}} = a + \sqrt{b}$$

Find $4ab$ (Write only in numbers)

(Correct +4, Wrong 0, Blank 0)

26. In $\triangle ABC$, point X lies on side AB and point Y lies on side AC . Lines BY and CX intersect at point P .

If the area of $\triangle BXP = 8$, the area of $\triangle CYP = 6$, and the area of $\triangle BCP = 12$, what is the area of the quadrilateral $AXPY$?

(Correct +4, Wrong 0, Blank 0)

27. A data set consists of 7 distinct numbers arranged in ascending order:
50, 60, 70, x , 90, 100, 110

It is known that the mean of the data is equal to its median.

Find the value of x . (Write your answer only in numbers.)

(Correct +4, Wrong 0, Blank 0)

28. Three bakers donated their bread. The first baker donated 3 breads, the second baker donated 2 breads, and the third baker donated 5 breads. If all the bread are put into one big basket, the probability of 3 bread randomly taken from the basket were all made by the same baker is $\frac{q}{p}$ (where $\gcd(p, q) = 1$)

What is the value of $p - q$? (Write only in numbers)

(Correct +4, Wrong 0, Blank 0)

29. A simple graph G has 44 edges. It has 8 vertices with degree 5. All the remaining vertices have degree 2.

How many vertices does G have in total?

(Correct +4, Wrong 0, Blank 0)

30. In a right triangle $\triangle ABC$ (right angled at A), AD is the altitude drawn to the hypotenuse BC , and AM is the median drawn to the hypotenuse BC .

If the angle $\angle ABC = 62^\circ$ is known, **what is the angle $\angle DAM$ (in degrees)?**

(Correct +4, Wrong 0, Blank 0)

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Answer Keys

No	Key	Code
1	C	KMF/4722/PEDUF
2	D	KMF/4790/3DE7F
3	D	KMF/4729/YDNNI
4	A	KMF/4922/FPMJH
5	D	KMF/4789/VXUO9
6	C	KMF/4779/0EY5P
7	A	KMF/4787/FC9MA
8	D	KMF/4791/FWTAQ
9	A	KMF/4785/DKHLM
10	D	KMF/4923/Y5GGP
11	C	KMF/4788/WFEUO
12	B	KMF/4792/BRHJO
13	C	KMF/4780/HTSYL
14	C	KMF/4786/J2KM9
15	B	KMF/4920/BBMVE
16	A	KMF/4732/FQBQT
17	C	KMF/4728/U0RCD
18	C	KMF/4919/4QQLR
19	C	KMF/4723/X2UEF
20	A	KMF/4921/GPCB3