ASMOPSS THAILAND 2026

Asian Science & Mathematics Olympiad for Primary and Secondary Schools (Thailand)

Mathematics Secondary G.10

Sunday, August 9, 2026

8:30 – 10:00 a.m. (90 minutes)

$$\sum x^2$$

B

Instructions

1. This exam includes 25 questions, with a total score of 100.
2. Fill out your name, grade, school, test center, room, seat number, and identification number either in pen or in pencil.
3. Use a 2B black pencil or darker one to fill in the circles corresponding to your answer written at the top.
4. Use a pen or a pencil to write your answer in the box at the top of the column.
5. If you want to change an answer that you have already marked, use a clean eraser to erase the incorrect answer and mark the new one.
6. It should be noted that figures in the exam are not drawn to scale.
7. Dictionaries, calculators, and electronic devices are not permitted in the test room.
8. Note taking can be done on the test paper only, with no extra sheet provided.
9. If the answer is a number that is more than 3-digit number or decimal number, please answer as the following pattern:
   - 9.1 If the answer is more than 3-digit number, then answer the last 3 digits.
   - 9.2 If the answer is more than two decimal places, then round the answer to the nearest hundredth.
10. Do not write anything or make any symbols in the black barcode area along the edge of the paper except the answers on the answer sheet. Make sure the answersheet is not crumpled.
11. Submit the answer sheet to the proctor when the time is up.
12. Cheating in the exam may cause serious consequences including disqualification from receiving any award or joining the second round of the test held by ASMOPSS THAILAND.

Should any disagreement arise, the judgment of the panel is deemed final.

Announcement of the results via https://asmopssthailand.com on September 18, 2026

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Contact US

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1. Find the value of $\dfrac{2^{n+2}-2^{n+1}}{2^n+2^{n-2}}$, where n is a real number. (2.5 points)

2. Let $A=\left\{x\in I\middle|x^2+2x-15<0\right\}$ and $B=\left\{x\middle||x-2|\le 3\right\}$. Find the number of elements in the power set $P\left(A-B\right)$. (2.5 points)

3. Consider the linear equations of line $L_1: p\left(x+1\right)=q\left(y+p\right)$ and $L_2: 2\left(p+q\right)x+qy=-2p$. If these two lines intersect the Y -axis at the same point, find the value of q. (2.5 points)

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4. Let n be the smallest positive integer greater than $2401^{\frac{3}{8}}$. Find the sum of all distinct prime factor of $n!$. (2.5 points)

5. Given $A = -\sin^2\left(0^\circ\right) + \sin^2\left(1^\circ\right) - \sin^2\left(2^\circ\right) \ldots - \sin^2\left(178^\circ\right) + \sin^2\left(179^\circ\right)$ and

$$B = -\cos^2\left(1^\circ\right) + \cos^2\left(2^\circ\right) - \cos^2\left(3^\circ\right) + \ldots - \cos^2\left(179^\circ\right) + \cos^2\left(180^\circ\right).$$

Find the value of $A - B$. (2.5 points)

6. Find the value of $\dfrac{\sqrt{14-2\sqrt{45}}+\sqrt{6+2\sqrt{5}}}{\sqrt{16+2\sqrt{63}}-\sqrt{8+2\sqrt{7}}}$. (2.5 points)

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7. Find the number of ways to form a four-digit positive odd integer not exceeding 4000, such that none of its digits is 0 and it contains at least one digit 2. (2.5 points)

8. Let A be the set of all non-negative integers m such that the parabolas $y = 5x^2 + \left(3m - 8\right)x + 8$ and $y = -4x^2 + mx + 2m$ do not intersect. Find the total number of proper subsets of A. (4.5 points)

9. Let the universal set be $U = \left\{x \in I \middle| x \in D_A \cap R_A\right\}$, where $A = \left\{\left(x, y\right) \middle| 25x^2 + 9y^2 - 100x + 18y - 116 = 0\right\}$. Find the sum of the squares of all integers in U that make the logical statement $\left[x^2 - 2 \le x\right] \to \left[x^3 - 1 = \left(x - 1\right)^3\right]$ false.

(4.5 points)

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10. A survey was conducted among a group of Japanese anime followers regarding their viewership of three series: One Piece, Demon Slayer, and Attack on Titan. The results are follows:

- The number of people who have never watched One Piece is 4 times the number of people who have watched Demon Slayer.
- The number of people who have never watched Demon Slayer is 2 times the number of people who have watched Attack on Titan.
- The number of people who have never watched Attack on Titan is 8 times the number of people who have watched One Piece.
- Exactly 102 people have watched only Demon Slayer.

Assuming that everyone in this group has watched at least one of these three series, find the minimum possible number of people in this group. (4.5 points)

11. Let $f\left(x\right)=\dfrac{\sqrt{5}x+\pi}{2x-\sqrt{5}}$ and $g\left(x+1\right)=\sqrt{x}-k$. Find the number of all integers k such that $(f\circ f\circ g\circ f\circ f\circ g\circ f\circ f)\left(3250\right)\le 0$. (4.5 points)

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12. Given

$$\left|\frac{49}{100}-\frac{50}{99}\right|+\left|\frac{47}{98}-\frac{48}{97}\right|+\ldots+\left|\frac{31}{82}-\frac{32}{81}\right|-\left(\frac{1}{100}+\frac{2}{98}+\ldots+\frac{10}{82}\right)+c\left(\frac{1}{99}+\frac{1}{97}+\ldots+\frac{1}{81}\right)=5.$$

Find the value of c that satisfies this equation. (4.5 points)

13. Let $ABCD$ be a quadrilateral where $\angle A$ and $\angle C$ are right angles. The length of side BC is 1 unit longer than half the length of side AB. Side DA is 1 unit shorter than side CD. The ratio of the length of side AB to side CD is $2:3$. Find the area of quadrilateral $ABCD$? (4.5 points)

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14. Given the proposition $\left[\sim\left(a\vee b\right)\wedge\left(c\vee d\right)\wedge\left(e\to f\right)\wedge g\right]\to\left(h\leftrightarrow i\right)$ where m and n represent the number of truth assignment cases in which the proposition is true and false, respectively. Find the value of $\left|m-n\right|$. (4.5 points)

15. The frequency distribution table of the ASMOPSS examination satisfaction scores of Grade 10 students is shown below:

Scores	Frequency
1	$a-2$
2	$a+2$
3	$2a-5$
4	a^2-9a-4
5	$2a-9$

If the arithmetic mean of satisfaction score is 3, and b and c represent the median and the mode of this data set, respectively, find the value of abc. (4.5 points)

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16. Let $f : I \to Q$ be a function satisfying the condition $f\left(x\right)+f\left(x\right)\cdot f\left(x-1\right)=\left(-1\right)^{x}\left[1-f\left(x-1\right)\right]$ for all $x \in I$. If $f^{-1}\left(2\right)=0$, find the value of $f\left(10\right)+f\left(11\right)+f\left(12\right)+...+f\left(898\right)$. (6 points)

17. Given that $Q\left(x\right)$ represents a polynomial of degree 2026, where the remainder obtained from dividing the polynomial $Q\left(x\right)$ by $x-k$ equals k when $k \in \left\{1,2,3,...,2026\right\}$, and the remainder obtained from dividing the polynomial $Q\left(x\right)$ by $x-2027$ equals 2033. If m and n represent any positive integers which make the remainder obtained from dividing the polynomial $Q\left(x\right)$ by $x-2030$ equal to $\left(n+m\right)^{m}+2$, find the value of $m\sqrt{n}$. (6 points)

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18. A designer designed a mirror bounded by the following equations: $x = -4$, $x = 4$, $y = -4$ and $y = 4 + \sqrt{16 - x^2}$. If the designer wants to build a wooden frame around the mirror with a thickness of 1 unit, find the area of the wooden frame. (Given $\pi = 3.14$.)

(6 points)

19. Consider three data sets A, B, and C, each of which contains the same number of data elements. When the elements of each set are arranged in order from the least to greatest, the various terms are obtained as follows:

- Set A : $a-2,\ \frac{a}{2}+5,\ a^2-10a-9,\ \frac{2a}{3}+7,\ \ldots,\ 3(a-2)$
- Set B : $2(a-4),\ a+6,\ 2a^2-20a-22,\ \frac{2}{3}(2a+15),\ \ldots,\ 6\left(a-\frac{8}{3}\right)$
- Set C : $3a-22,\ \frac{1}{2}(3a-2),\ 3(a-5)^2-118,\ 2a+5,\ \ldots,\ 9a-34$

Given that b and c represent the arithmetic mean of data set B and set C, respectively, find the value of $c+\sqrt{b}$ if it is known that the arithmetic mean of data set A is equal to 20. (6 points)

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20. Given that $S = \left\{ m \in \mathbb{N} \middle| 212 \leq 57m - m^2 \right\}$, if an integer m is randomly selected from S, find the probability that $m^4 - m^3 - m^2 - m + 3$ will is divisible by $m - 3$ or $m + 3$.

(6 points)

21. Find the sum of all integers x that satisfy the equation $\left| \frac{x^2 - 1}{x^2 - 7x + 6} \right| = \frac{1 - x^2}{x^2 - 7x + 6}$.

(2.5 points)

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22. Let p,q,r,s be real numbers such that they satisfy the following equations

$$\frac{1}{p^2+90p+2025}=\frac{1}{q^2-120q+3600}=\frac{1}{r^2+104r+2704}=\frac{1}{s^2-98s+2401}.$$

Given that the sum of p,q,r,s is equal to 14, find the value of $2p+3q+4r+5s$.

(4.5 points)

23. Points $A(-2,2)$, $B(3,12)$, and $C(x,y)$ lie on the line $y=2x+6$. Given a point P, if the area of triangle ABP is half the area of triangle ACP, find the value of xy. (2.5 points)

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24. Let $m,n \in I$ such that a triangle with vertices at $(m,0),(0,n)$, and (m,n) has an area of 72 square units. If a pair of (m,n) is chosen at random, the probability that the triangle is isosceles is $\frac{p}{q}$, where $\gcd(p,q)=1$. Find the value of pq. (2.5 points)

25. Given $A=\{1\}$. Let m and n represent the number of subsets of $P(P(P(A)))\cup P(P(A))$ that contain 3 elements and 15 elements, respectively. Find $lcm(m,n)$. (4.5 points)

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GRADE 10 ANSWER KEY

No.	Answer	No.	Answer
1	1.6	14	476
2	8	15	90
3	3	16	555.5
4	77	17	135
5	0	18	40.13
6	2	19	50
7	575	20	0.14
8	15	21	13
9	5	22	134
10	442	23	176
11	50	24	15
12	49	25	816
13	33.33		

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