


International SoM Contest 2025 Grade Five Solutions

- 1) **B** Follow the order of operations and calculate: $25 - 5 \times 2 + 12 = 25 - 10 + 12$
 $= 15 + 12$
 $= 27$
- 2) **B** Since a palindrome is a number or word that can be read the same forwards and backwards, the first number needs to be identical to the last number. Therefore, placing 2 at the beginning of the number would make it a palindrome: 2854582.
- 3) **D** The pattern represents multiple rotations of the figures by 90° clockwise.
 rotation by 90° clockwise another rotation by 90° final rotation by 90° clockwise
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- Therefore, option D) is the shape that come next in the pattern.
- 4) **C** Maya and Mei are walking a total of $120 + 205 = 325$ m. Therefore, at the end of the walk, the girls will be $500 - 325 = 175$ m apart.
- 5) **C** Since 70 minutes = 60 minutes + 10 minutes and 60 minutes = 1 hour, then Ming needs 1 hour and 10 minutes to finish his homework. One hour and 10 minutes after 5:15 p.m. is (5 + 1) hours + (15 + 10) minutes or 6:25 p.m.
- 6) **A** Since Saira caught the ball four times, she made $4 \times 5 = 20$ steps forward. Also, since she missed the ball six times, she made $6 \times 3 = 18$ steps backward. As $20 - 18 = 2$, her final position with respect to the "Start" line is two steps forward.
- 7) **C** The pattern in the sequence is that the differences between the numbers increase by 3 each time (3, 6, 9, 12...). The next difference will be 15, so we add 15 to the last number, 49, to get 64. Therefore, the next term in the sequence is 64.
- 8) **B** Make an organized chart to determine the number of silver and gold fish :

	Silver fish	Gold fish
Today	3	9
In 2 weeks	$3 + 2 = 5$	$9 + 1 = 10$
In 4 weeks	$5 + 2 = 7$	$10 + 1 = 11$
In 6 weeks	$7 + 2 = 9$	$11 + 1 = 12$
In 8 weeks	$9 + 2 = 11$	$12 + 1 = 13$
In 10 weeks	$11 + 2 = 13$	$12 + 1 = 14$
In 12 weeks	$13 + 2 = 15$	$14 + 1 = 15$

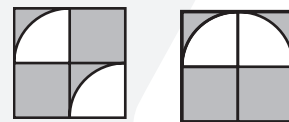
Therefore, you will have the same number of fish in 12 weeks.

- 9) **D** The equation would be true if the expressions on both sides have the same prime numbers with the same exponents. Since $2^4 \times 2 = 2^5$, $3 \times 3 = 3^2$, and $5 \times 5^2 = 5^3$, then $2^4 \times 3 \times 5 \times (2 \times 3 \times 5^2) = 2^5 \times 3^2 \times 5^3$ or $M = 2 \times 3 \times 5^2$, or $M = 150$.
- 10) **D** The only option that works is 16 because $16 + 16^2 + \sqrt{16} = 276$
- 11) **A** The total number of balls in the box is $4 + 2 + 3 = 9$.
 There are four tennis balls. The probability is $\frac{4}{9}$.
- 12) **D** As the weight of Kumar's pants is a third of the weight of his shoes, his pants' weight is $1.5 \div 3 = 0.5$ kg. Thus, Kumar's weight without the shoes and pants is $52 - 1.5 - 0.5 = 50$ kg.

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- 13) **B** The prime factorization of 140 is $2^2 \times 5 \times 7$.
For 28 the prime factorization is $2^2 \times 7$.
Since all the prime factors of 28 are in 140, then 140 is divisible by 28.
- 14) **A** Since the first stick is 120 cm long, then the second and the third sticks are 90 cm long, then the average of their lengths is $(120 + 90 + 90) \div 3 = 300 \div 3$ or 100 cm.
- 15) **C** If the bicycle travels 10 meters in 1 second, multiplying by 60 tells us it travels 600 meters in 1 minute. Multiplying by 60 again, we find it travels 36,000 meters in 1 hour.
Since 36,000 meters = 36 kilometers, the bicycle's speed is 36 km/h.
- 16) **C** The perfect squares from 1 to 20 are $1^2 = 1$, $2^2 = 4$, $3^2 = 9$, and $4^2 = 16$. Since there are four numbers that are perfect squares, then there are $20 - 4 = 16$ numbers that are not.
- 17) **C** Peter wants an average score of 86 across three tests. To find out what he needs on the third test, we first figure out the total score required for that average, which is $86 \times 3 = 258$.
Since he already scored 82 on the first two tests, their combined total is 164.
Subtracting this from the required total, Peter needs to score $258 - 164 = 94$ on his third test to reach his goal.
- 18) **B** If the ratio of boys to girls is 4:5, then the ratio of girls to total is 5 : 9. Since $378 \div 9 = 42$, then multiply $5 \times 42 = 210$ for the number of girls.
- 19) **A** Make an organized chart to determine in which container are the chocolate chips. Since sugar is neither in the white nor the black container, then sugar must be in the red container. Also, since flour is not in the white container, it must be in the red or black container.
- | | Red | White | Black |
|----------------|-----|-------|-------|
| Chocolate chip | X | ✓ | X |
| Sugar | ✓ | X | X |
| Flour | X | X | ✓ |
- As sugar is in the red container, flour is in the black container. Therefore, the chocolate chips are in the white container.
- 20) **B** The number $\frac{11}{6}$ is one-sixth less than 2.
The number $\frac{37}{19}$ is one-nineteen less than 2, so it is closer to 2 than $\frac{11}{6}$.
The number $\frac{18}{9}$ is equal to 2.
The number $\frac{27}{13}$ written as a mixed number is $2\frac{1}{13}$, which is greater than 2.

- 21) **B** The two numbers that add up to 7 and multiply to 10 are 2 and 5. Their factorials are $2! = 2$ and $5! = 120$. Adding these together gives $2 + 120 = 122$. SO, the sum of their factorials is 122.
- 22) **C** From the given information it is evident that the larger number is a three-digit number and the smaller number is a two-digit number. When the last digit 0 is taken away from the larger number, the numbers become equal so the sum of these two numbers can be represented as $AB0 + AB = 330$ (where A and B are different digits). Since $0 + B = 0$, then $B = 0$. Also, since $B + A$ or $0 + A = 3$, then $A = 3$. Thus, the larger number is 300 and the smaller number is 30.
- 23) **C** The light bulbs that have a power less than 60 watts are light bulbs with a power of 40 and 50 watts. Ten percent of all light bulbs have a power of 40 watts and 25% of all light bulbs have a power of 50 watts. Therefore, $10 + 25 = 35\%$ of all light bulbs have a power less than 60 watts. As 35% of 300 is $0.35 \times 300 = 105$, there are 105 light bulbs in the hardware store with a power less than 60 watts.
- 24) **C** If the perimeter of the square is 36 cm, then the length of each side is $36 \div 4 = 9$ cm. The area is $9 \times 9 = 81$.
- 25) **B** List all triangles in the alphabetical order: ABD, ABE, ACD, ACE, BCD, BCE, DEA, DEB, and DEC. Therefore, there are nine triangles.
- 26) **D** Since the sum of numbers on opposite sides of the die is always equal to 5, then the pairs of numbers on the opposite sides are (0, 5), (1, 4), and (2, 3). Since 0 is visible from the top, 5 is at the bottom. Since 1 is visible from the front, 4 is at the back. Finally, since 2 is visible from the left, 3 is on the right side. If the die is viewed from the right side (with number 3 at the front), the order of numbers starting from left in a clockwise direction is 1, 0, 4, and 5. After the die is rolled, the order of the numbers displayed would remain the same. Since number 3 is at the front and number 5 is on the left side of the die, then 2 is at the back and 0 is on the right side. Following the order of the numbers in a clockwise direction, number 4 is at the bottom. Thus, number 1 is at the top.
- 27) **A** The expression $2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9$ has a 2 and a 5. Since $2 \times 5 = 10$ the expression can be written as $3 \times 4 \times 6 \times 7 \times 8 \times 9 \times 10$. As any number multiplied by 10 will have 0 as its units digit, the units digit of the product is 0.
- 28) **C** Use the Gauss formula to find the sum of the series.
Therefore, $1 + 2 + 3 + \dots + 9 = 10 \times 9 \div 2$ or 45. Then, relocate the numbers to solve the expression: $45 \div 27 \div 25 \times 3 \times 55 = 45 \times 3 \div 27 \times 55 \div 25$
$$= 5 \times 55 \div 25$$
$$= 11$$
- 29) **B** When calculating the area of a shape, the parts of the shape can be rearranged for easier calculation. The shaded regions of the original and the second shape from the diagram have the same area. The part of the large square that is not shaded is a semicircle. Therefore, the area of the shaded region can be found by taking away the area of the semicircle from the area of the large square. The only correct answer is B).



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- 30) **C** Since 1 hour has 60 minutes, then 20 minutes is a third of an hour. If the machine can wrap 12 candies per 20 minutes, then it can wrap $12 \times 3 = 36$ candies per hour. In 10 hours, that is $36 \times 10 = 360$ candies wrapped. The owner of a local store bought 72 out of 360 wrapped candies, which is $72 \div 360 \times 100 = 20\%$.
- 31) **B** Since angle a is half the size of angle b , then angle b is two times the size of angle a or $b = 2a$. Since angle b is half the size of angle c , then angle c is two times the size of angle b or $c = 2b$, or $c = 4a$. Since angle b is equal to angle d , then the size of angle d is two times the size of angle a or $d = 2a$. Since the angle sum in a quadrilateral is 360° and since the angles in this quadrilateral combined equal to $1 + 2 + 4 + 2 = 9$ times angle a , then the angle a is equal to $360^\circ \div 9 = 40^\circ$.
- 32) **D** Since $1.6 \text{ km} = 1600 \text{ m}$ and since Mao ran 40% of 1.6 km, he ran $0.4 \times 1600 = 640 \text{ m}$. The remaining part of the field is $2000 - 640 = 960 \text{ m}$. Nam ran 20% of the remaining part of the field or 20% of 960 m which is $0.2 \times 960 = 192 \text{ m}$. Therefore, Rob ran the remaining part of the field or $960 - 192 = 768 \text{ m}$. Alternatively, as Rob ran the remaining part of the field after Mao and Nam, he ran $1600 \times 0.6 \times 0.8 = 768 \text{ m}$.
- 33) **B** Let x and y represent the number of players in two teams. Since each player from the team with x players gave a high-five to y players from the other team, then the total number of high-fives was $x \times y = 30$. Also, as one of the teams has one player more than the other, x and y are two consecutive integers. The only two consecutive numbers that have a product of 30 are five and six. Therefore, the team with one more player had six players.
- 34) **C** A cube has six faces. If a cube has exactly four faces that are not painted, then it has exactly two faces that are painted. So the question is asking how many cubes are painted on exactly two faces. Three cubes along each of the 12 edges are painted on exactly two faces, giving $3 \times 12 = 36$ cubes unpainted on exactly four faces.
- 35) **D** Since $A + B = C$, and $B + C = D$, C must be larger than both A and B but not too large, as all numbers are between 1 and 6. The only value that fits is $C = 4$, with $A = 3$ and $B = 1$, because $3 + 1 = 4$. Using these, D becomes 5 (since $1 + 4 = 5$), and with $E = 2$, F becomes 6 (because $4 + 2 = 6$). So, the values are: $A = 3$, $B = 1$, $C = 4$, $D = 5$, $E = 2$, and $F = 6$.
The answer is $C = 4$.
- 36) **C** If there are 222 eyes, there are 111 animals. Chickens have two legs and dogs have four legs, so every animal has at least 2 legs. Since $2 \times 111 = 222$ legs, there are $266 - 222 = 44$ extra legs, or $44 \div 2 = 22$ pairs of legs that must belong to the dogs. This gives 22 dogs.
- 37) **C** Let P represent the product of all numbers from 1 to 25. A prime factorization of P contains powers of all primes from 1 to 25. To determine which number is a factor of P , prime factor offered answers. Since $58 = 2 \times 29$ and 29 is larger than 25, so P is not divisible by 29 and P is not divisible by 58. Since $93 = 3 \times 31$ and 31 is larger than 25, so P is not divisible by 31 and P is not divisible by 93. Since $161 = 7 \times 23$ and 23 and 7 are less than 25, P is divisible by 161. Since $205 = 5 \times 41$ and P is not divisible by 41, then P is not divisible by 205.
- 38) **B** The area of the larger lawn is $90 \times 90 = 8100 \text{ m}^2$. The area of the smaller lawn is $45 \times 45 = 2025 \text{ m}^2$. Dividing, $8100 \div 2025 = 4$. Therefore, it takes one quarter of the time to mow the smaller lawn or 15 minutes.

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- 39) **A** The number 10^{49} contains a 1 followed by 49 zeros when multiplied out. Subtracting 2 gives 48 nines and an eight. Calculating the sum of the digits, we have $48 \times 9 + 8 = 440$.
- 40) **C** In order to decrypt the message from Dhruv, Anja needs to write the received message in a matrix format. Because each of the rows should have five letters and the received message has 25 letters, then Anja's matrix would have five rows ($25 \div 5 = 5$). Now, reading row by row, Anja would decrypt the message into "LET US MEET AT THE CORNER STORE".

L	E	T	U	S
M	E	E	T	A
T	T	H	E	C
O	R	N	E	R
S	T	O	R	E