

Mission Math Spring Competition 2025 6-8 Exam

You will have 40 minutes to complete as much of this test as you can. There are 30 free response questions total, and questions are arranged roughly from easiest to most difficult. Units are not needed. Write answers on the given line below each question. Calculators are not allowed. Do not begin the test until told to do so. Good Luck!

Full Name: _____

Grade: _____

Age: _____

1. What is the median of the numbers 15, 18, 16, 12, 15, 25, 3?

2. Kimchi costs \$8 per jar. Hailey has \$115. How many jars of kimchi can Hailey buy?

3. How many factors does 18 have?

4. What is the sum of the exterior angles in a regular 2025 – gon?

5. A farmer has chickens and cows on his farm. All animals have 1 head. Chickens have 2 legs, and cows have 4 legs. There are 28 heads and 80 legs in total on the farm. How many cows are there?

6. How many ways can you arrange 3 identical red marbles and 2 identical blue marbles in a line?

7. Lebron scores 15 points in the first quarter, 12 points in the second quarter, 9 in the third quarter, and X points in the fourth quarter. If his average number of points per quarter is 12 points, what is X ?

8. What is the sum of all multiples of 5 between 10 and 100, inclusive?

9. Ellie rolls 2 standard die and multiplies the 2 numbers she gets. What is the probability that the number she obtains is even? Express your answer as a common fraction.

10. Circle A has a radius of r_a and an area of A_a . Circle B has a radius of r_b and an area of A_b . Given that $\frac{A_a}{A_b} = 9$ what is $\frac{r_a}{r_b}$?

11. Nathan has a red shirt, a blue shirt, and a green shirt. He also has red pants, blue pants, and green pants. He wants to wear one shirt and one pair of pants, but he doesn't want his shirt and pants to be the same color. How many possible outfits can he make?

12. Ryan and Olivia are planning to meet up. Ryan rides his bike at 10 mph and Olivia walks at 2 mph. If their houses are 8 miles apart, how many minutes does it take for them to meet up?

13. On planet Zab they have 3 forms of currency, Zebs, Zibs, and Zobs. 14 Zebs are equal to 9 Zibs, and 15 Zibs are equal to 17 Zobs. How many Zobs are equivalent to 42 Zebs?

14. What is $\frac{7! \cdot 8!}{6! \cdot 9!}$

15. James is standing in the corner of a rectangular field with side lengths of 12 feet and 16 feet. He wants to get to the opposite corner from where he is at now. How many less feet does he walk if he cuts across the field in a straight line compared to if he walked around the edge of the field?

16. Johnathan has 8 pieces of candy to distribute among 3 people. How many ways can he distribute the candy if not everyone must receive candy?

17. There is a 30% chance it rains on Monday, a 60% chance it rains on Tuesday, and a 20% chance it rains on Wednesday. What is the probability it rains on at least 1 of these days? Express your answer as a common fraction.

18. A square is inscribed in a circle of radius 20. What is the area of the circle that is not in the square? Express your answers in terms of π .

19. What is the hundreds digit of $15 \cdot 9 \cdot 18 \cdot 75 \cdot 36$?

20. The roots of the cubic $2x^3 - 18x^2 + 5x - 40$ are a , b , and c . What is the value of $a^2 + b^2 + c^2$?

21. Three random positive numbers X , Y , and Z are generated such that they are all less than 2. What is the probability that their sum is less than 1?

22. The sum of 3 prime numbers is 14. What is the sum of the squares of these 3 numbers?

23. $ABCD$ is a cyclic quadrilateral with diagonals AC and BD intersecting at E . $\widehat{AD} = 80^\circ$ and $\widehat{BC} = 120^\circ$. What is the value of $\angle AED$?

24. Jimmy rolls an 8-sided dice twice. What is the probability that the number he rolled on the second roll is a factor of the number rolled on the first roll?

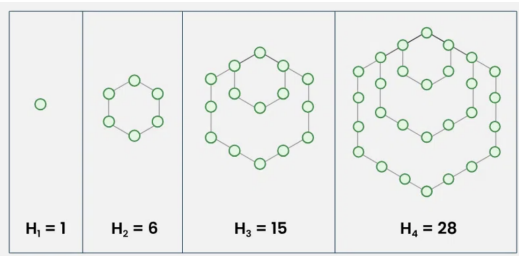
25. What is the units digit of $7^{102} \cdot 6^{100}$?

26. Kevin is running to school, which is 6 miles away. However, he is a slow runner, so he goes at 2 miles per hour for the first 4 miles. He leaves at 7 am, and needs to get to school by 9 : 30 am. How fast does he need to run for the last 2 miles?

27. Steph scored 25 points with only 2-point and 3-point shots. What is the probability she didn't score 2 consecutive 3-point shots? Express your answer as a common fraction

28. Freddie exists in the coordinate plane and is currently at the origin. Freddie can make hops from (x, y) to $(x, y + 1)$ or from (x, y) to $(x + 1, y)$. If Freddie can never go above the line $y = 0.5x$. How many ways can Freddie reach the point $(10, 5)$. Note that Freddie can touch the line $y = 0.5x$.

29. H_n is the number of dots in n concentric hexagons. The hexagonal numbers are defined as written below. If H_j is a perfect square, find the smallest possible value of j such that $j > 1$.



30. A regular hexagon is inscribed in a circle with center O , and radius 1. Let the expected value of OP given that P is a random point in the regular hexagon, be A , and the expected value of OQ given that Q is a random point in the circle be B . Find $(A \cdot B)^2$.
