# 2026 Pi Day Math Competition

Part I

**Time: 25 Minutes — Calculators: No**

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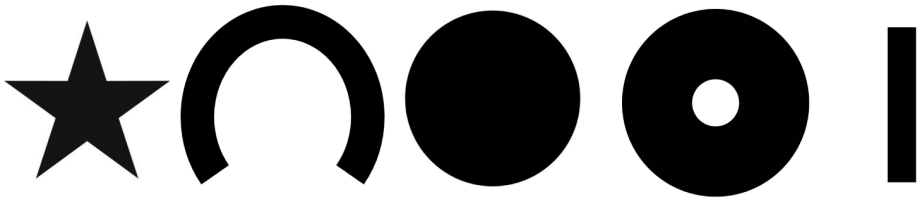
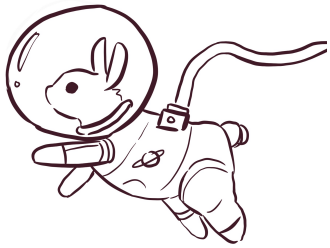
**1.** If 5 consecutive integers sum to -5, what is the first integer?

**2.** If a circular wheel with a radius of 5 cm does 3 full rotations, how far does it travel?

**3.** We call a shape star-shaped if there exists a point $a$ inside it such that we can draw straight lines from $a$ to every other point in the shape, each contained within the shape. Which of the following are star-shaped? (Circle them on your answer sheet)



**4.** There are 100 astronauts at the ISS. 67 of them have a Special Water Tube to drink from. 41 of them have a Special Lunch Pipe to eat from. 21 of them have both. How many have neither?



**5.** A *googly* number is a number where the product of its digits is prime. How many *googly* numbers are there less than 1000?

**6.** In the world championship slapping competition, each competitor slaps every other competitor once. If there are 42 slaps, how many people are in the world championship?

**7.** A team of six is running a piggy-back race:

1. Damian has a running speed of 10 m/s.
2. Lisa has a running speed of 8 m/s.
3. Kareem has a running speed of 12 m/s.
4. Kareena has a running speed of 14 m/s.
5. Nicholas has a running speed of 14 m/s
6. Wiley has a running speed of 12 m/s.

In this particular race, each person partners up with someone else who they carry on their back. Their "score" is their total distance (across all three pairs) they can run in 10 seconds, which they seek to maximize. Assume that each runner's running speed is unaffected by having someone on their back.

a. Find the optimized score

b. Find the total amount of player combinations that result in this optimized score

**8.** The Sonoma County student council has 3 Maria Carrillo graduates and 3 Tech High graduates. If we randomly select two of them to co-chair a committee, what is the probability that these chairpersons are graduates from the same high school? Express your answer as a simplified fraction.

**9.** What is the value of

$$\left\lfloor \frac{1}{2} \right\rfloor + \left\lceil \frac{1}{2} \right\rceil + \left\lfloor \frac{2}{2} \right\rfloor + \left\lceil \frac{2}{2} \right\rceil + \left\lfloor \frac{3}{2} \right\rfloor + \left\lceil \frac{3}{2} \right\rceil + ... + \left\lfloor \frac{31}{2} \right\rfloor + \left\lceil \frac{31}{2} \right\rceil ?$$

Note that $\lfloor \cdot \rfloor$ denotes the greatest integer less than or equal to a number, and $\lceil \cdot \rceil$ denotes the least integer greater than or equal to a number. For example, $\lfloor 7.8 \rfloor = 7$ and $\lceil 7.2 \rceil = 8$. Think of it like rounding down and rounding up.

**10.** Find the sum of the units digits (1s place digits) of the numbers

$$1!^2,\ 2!^2,\ 3!^2,\ \ldots,\ 314!^2.$$

Check out the Helpful Formulas section to see the definition of $n!$.

*Stop. End of Section One.*

# 2025 Pi Day Math Competition

Part II

**Time: 25 Minutes — Calculators: No**

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**1.** Bad Bunny has a rectangular box of cookies. One face has an area of 24 square inches. Another face has an area of 30 square inches. The third face has an area of 20 square inches. What is the volume of the cookie container?

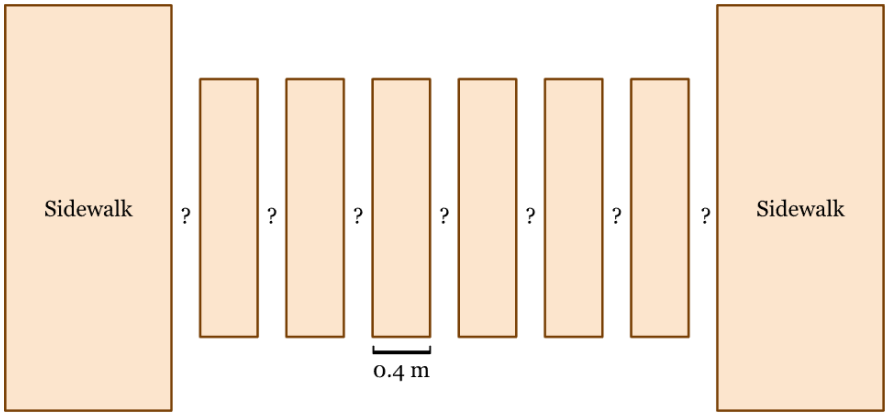

**2.** What is the smallest odd number that is a multiple of four different prime numbers?

**3.** Playboy Carti is able to chug matcha at a rate of 1 L/min. However, after each minute of chugging, his chugging rate gets cut in half. If he chugged until the end of time, how many liters would he have chugged?

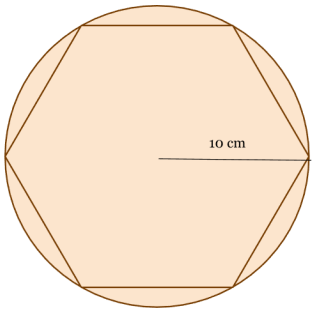
**4.** Tennis balls are placed on the ground in a filled-in square, then in each space between four

tennis balls, another ball is placed, forming another square, finishing with a single ball at the top. If the base is 6x6, how many balls are in the pyramid?

**5.** Olivia Rodrigo is painting crosswalk lines. If the sidewalks are 32 meters apart, and each of the 35 equally spaced painted rectangles is 0.4 meters wide, what is the width of each space? There is a space between the sidewalk and the first and last painted rectangles.




**6.** If the radius of the circle above is 10 cm, what is the area of the inscribed regular hexagon (the sides of a regular hexagon all have the same length)?




**7.** Let a rectangle ABCD exist in the coordinate plane such that:

- A is at (-1,-1)
- B is at (-1,3)
- C is at (5,3)
- D is at (5,-1)

What is the ratio of the area of ABCD and the self-intersecting polygon ACBD? (To form ACBD, connect the vertices in the order of $A \to C \to B \to D \to A$)

**8.** Ronaldo is pretty good at soccer. The probability that he makes a goal is unknown, let it be $p$. He takes 5 kicks in a row. The ratio of the probability that he makes 2 goals to the probability that he makes 3 goals is $\frac{1}{2}$. What is $p$?

**9.** Lisa really, really likes sprinkles, and she has a LOT of them. When she tries to sort them into piles of 3, she has 2 left over. When she tries to sort them into piles of 4, she has 3 left over. When she tries to sort them into piles of 5, she has 4 left over. What is the smallest amount of sprinkles Lisa could have?

**10.** Shengkai decides to start a farm where he has a field with 50 female cows and 50 male cows, for a total of 100. If Shengkai pairs each cow with another cow such that there are 50 pairs of cows, what is the expected number of pairs of cows that consist of one male cow and one female cow?

*— End of Competition —*

# 2026 Pi Day Math Competition

Helpful Formulas and Clarifications

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**1.** 1 is not prime.

**2.** The area of a circle with radius $r$ is $\pi r^2$

**3.** The circumference of a circle with radius $r$ is $2\pi r$

**4.** The area of an equilateral triangle with side length $s$ is

$$\frac{s^2\sqrt{3}}{4}$$

**5.** A geometric sequence is a list of numbers where each term is found by multiplying the previous number by a common ratio $r$ like 2, 6, 18, 54... The sum of an infinite geometric sequence with a common ratio $0 < r < 1$ and first term $a$ is

$$\frac{a}{1-r}$$

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**6.** The sum of the first $n$ positive integers,

$$1 + 2 + 3 + \cdots + n,$$

is given by

$$\frac{n(n+1)}{2}.$$

**7.** Given the quadratic $ax^2 + bx + c$, the two solutions for $x$ can be solved by factoring or the quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**8.** $n$ factorial, or $n!$, is the product of all positive integers less than or equal to $n$. In other words, $n! = n * (n-1) * (n-2)...3 * 2 * 1$. For example, $3! = 3 * 2 * 1 = 6$.