Phantom Lake Math Challenge
May 2019
American Landmarks

The Phantom Lake Math Challenge is an open invitation to have fun solving problems at home with family. It's an opportunity for students to discover different ways to approach problems and a chance for students to share their math thinking and ideas with others. Anyone can participate. Choose the problem that fits your math ability/interest. These problems are generally in an order of increasing difficulty. Please submit your answer using the response form attached or available at http://phantomlakepta.org/Doc/Monthly%20Math%20Challenge/Math%20Challenge%20Response.pdf. You should turn in one form for each problem you solve. Feel free to showcase your creativity and design a poster or chart to show your work as well. Sometimes acting out problems and using objects can help students develop a deeper understanding of the problem. Please put the letter or title of your problem, your first and last name and your teacher's name on the form when you submit it. All solutions are due by the last school day of the month. Bring your completed form(s), charts, and posters to your teacher by May 31st. Students who successfully complete the challenge with the correct answer and an explanation of their mathematical thinking will receive a certificate and a prize. Happy problem solving!

Problem A
Mount Rushmore National Memorial in SOuth Dakota features the faces of 4 U.S. presidents carved in stone. Facing the monument, you will see Abraham Lincoln to the right of Theodore Roosevelt, and George Washington to the left of Thomas Jefferson. Jefferson is between Washington and Roosevelt. State the order of the faces of the 4 presidents. If you were the architect, how many different arrangements of these faces could you make?

Problem B
The **Lincoln Memorial**, located in Washington, D.C., was constructed to honor the 16th president of the United States. The memorial is 99 feet tall and features a 19-foot statue of President Abraham Lincoln sitting on a large chair. What is the difference between the height of the statue and the height of the memorial? In his Gettysburg Address speech, President Lincoln spoke of "four score and seven years ago." A score is 20 years. How many years was he talking about?

Problem C
The White House has 6 floors and 132 rooms. A group of students visits 10 rooms on the ground floor and 8 rooms on the 1st floor, called the *state floor*. When the tour ends, the guide comments that 16 rooms on the 2nd floor and 20 rooms on the 3rd floor could not be accessed. How many rooms did the students visit? How many rooms were they unable to visit?

Problem D
Mount Vernon is George and Martha Washington's home in Virginia. Mr. Matthews is planning a field trip and needs a chaperone for every 5 students. How many chaperones are needed for 60 students? On the day of the field trip, 3 students are absent. How many chaperones are needed? The students had a mansion tour, a tomb visit, and a lunch that took 20 minutes each. Then they had a garden tour that took 30 minutes. If they began at 11:00 a.m., what time did they finish?

Problem E
The Kennedy Space Center, located in Cape Canaveral, Florida, is open seven days a week from 9:00 a.m. to 5:00 p.m. Tours are available every day and run every 15 minutes, with the last tour leaving 2 ½ hours before closing. How many tours are given per day? How many tours are given per week?

Problem F
Disneyland opened on July 17, 1955 in Anaheim, California. In 1995, a time capsule was buried in Sleeping Beauty's castle and will be opened on July 17, 2035, to celebrate Disneyland's anniversary. Which anniversary will Disneyland be celebrating? How many years old will the time capsule be when it is opened?

Problem G
At the Grand Canyon in Arizona, a fund tourist attraction is taking a mule ride down into the canyon. A mule ride costs $42 per person. To pay for the cost of 1 person, what are 3 different bill combinations that could be used?

Problem H
The Deep Eddy Pool in Austin, Texas, is fed by the Colorado River. It is an Olympic-size swimming pool measuring 50 meters long and 25 meters wide. The city's Parks and Recreation department wants to create a pool cover to protect the Deep Eddy during the winter. How many square meters must the pool cover be? How many square centimeters would that be?

Problem I

The Gateway Arch in St. Louis, Missouri,, stands 630 feet tall. It features a tram system of 16 cars with a capacity of 5 passengers per car. The tram makes 80 daily trips to the top of the Arch during the summer and 48 daily trips in the winder. If the tram is full for each trip, how many more people visit the top each day in summer than in winter?

Problem J

Washington's Space Needle tower in Seattle reflects the "Age of Space." At 520 feet high, it has an observation deck that resembles a saucer-shaped spaceship. To get there, take one of 3 elevators that travel at 10 miles per hour. When it is windy, each elevator travels at half that speed. About how many seconds does it take an elevator to reach the observation deck on a windy day?

Problem K

The Golden Gate suspension bridge in San Francisco, California, measures 8891 feet long. If you are traveling at 45 miles per hour (mph), how long will it take to cross the bridge? The average person walks at a pace of 3.1 mph. If you walk the length of the bridge and back, how long would your walk be in minutes? Take a step and measure the distance in inches to calculate your stride length. How many steps would you take to cross the bridge?

Problem L

Cedar Point, a roller coaster extravaganza park, is in Ohio. Their newest roller coaster, Steel Vengeance, is 5740 feet long and runs for 2 minutes and 30 seconds. What is its average speed per second? At Cedar Point, a 28 oz. souvenir bottle costs $11.99 with $1 refills all season long, and $29.99 will get you unlimited refills for the season. If a 20 oz. drink costs $4.49 and a 30 oz. drink costs $4.89, how many drinks would you have to purchase to save money with the refillable souvenir bottles?