

# MATHCOUNTS<sup>®</sup> Problem of the Week Archive

## Grand Canyon Skywalk – April 18, 2022

### Problems & Solutions

The Grand Canyon Skywalk opened on March 28, 2007. It is owned and operated by the Hualapai Tribe at the Grand Canyon's western rim. The horseshoe shaped Skywalk extends 70 feet beyond the edge of the rim and is 4000 feet above the floor of the canyon. The walkway consists of 5 layers of glass. The bottom 3 layers are each 19 mm thick and the top 2 layers are 6 mm and 8 mm thick. To prevent the glass from being damaged, visitors are required to wear a special bootie over each foot.

The Sears Tower, in Chicago, Illinois, is 1,450 feet in height. The height of a model of the Sears Tower is 9 feet 6 inches. A scale model of the Grand Canyon and the Skywalk is built to the same scale as the Sears Tower. What is the number of feet in the distance from the floor of the canyon to the Skywalk in the model? Express your answer as a decimal to the nearest tenth.

*We can solve this problem by setting up a proportion:  $1450/9.5 = 4000/x$ , where  $x$  represents the number of feet from the floor of the canyon to the Skywalk in the model (and 9 feet 6 inches is expressed as 9.5, since 6 inches is half of one foot). Cross multiplying, we find  $1450x = 38,000 \rightarrow x \approx 26.2$  feet.*

The Skywalk is capable of supporting 71 million pounds. Assume the average weight per person on the Skywalk is 180 pounds and the maximum 120 people are on the Skywalk. What percent of the capable supporting weight is on the Skywalk? Express your answer to the nearest hundredth.

*The total weight on the Skywalk is  $(120 \text{ people}) \times (180 \text{ pounds/person}) = 21,600$  pounds. This is  $21,600/71,000,000 = 0.0003042254 \approx 0.03\%$  of the capable supporting weight.*

The driving distance from Flagstaff, Arizona to the entrance to Grand Canyon West is 216 miles. The estimated travel time is 3 hours and 50 minutes. If a car is driven these 216 miles, what is the average speed of the car in miles per hour? Express your answer to the nearest whole number.

*First, 50 minutes is  $50/60 = 5/6$  of an hour, so the estimated time to drive this distance is  $3 \frac{5}{6}$  hours. The average speed of the car that drove this distance in this time is  $(216 \text{ miles}) / (3 \frac{5}{6} \text{ hours}) \approx 56$  miles per hour.*

The cost to build the Skywalk was \$40 million. When the Skywalk first opened, the entrance fee to walk out on the Skywalk was \$25 per person. If \$15 of each admission fee went towards paying for the construction of the Skywalk, and if the admission fee was never raised, how many visitors would need to pay the entrance fee to recover the cost of building the Skywalk? Express your answer to the nearest thousand.

*Dividing  $\$40,000,000$  by  $\$15$  per visitor that goes towards paying for the construction gives  $40,000,000/15 = 2,666,666.666667$  visitors. Rounded to the nearest thousand, this gives **2,667,000** visitors needed to recover the cost of building the Skywalk.*

# **MATHCOUNTS<sup>®</sup> Problem of the Week Archive**

## ***Grand Canyon Skywalk – April 18, 2022***

### ***Problems***

The Grand Canyon Skywalk opened on March 28, 2007. It is owned and operated by the Hualapai Tribe at the Grand Canyon's western rim. The horseshoe shaped Skywalk extends 70 feet beyond the edge of the rim and is 4000 feet above the floor of the canyon. The walkway consists of 5 layers of glass. The bottom 3 layers are each 19 mm thick and the top 2 layers are 6 mm and 8 mm thick. To prevent the glass from being damaged, visitors are required to wear a special bootie over each foot.

The Sears Tower, in Chicago, Illinois, is 1,450 feet in height. The height of a model of the Sears Tower is 9 feet 6 inches. A scale model of the Grand Canyon and the Skywalk is built to the same scale as the Sears Tower. What is the number of feet in the distance from the floor of the canyon to the Skywalk in the model? Express your answer as a decimal to the nearest tenth.

The Skywalk is capable of supporting 71 million pounds. Assume the average weight per person on the Skywalk is 180 pounds and the maximum 120 people are on the Skywalk. What percent of the capable supporting weight is on the Skywalk? Express your answer to the nearest hundredth.

The driving distance from Flagstaff, Arizona to the entrance to Grand Canyon West is 216 miles. The estimated travel time is 3 hours and 50 minutes. If a car is driven these 216 miles, what is the average speed of the car in miles per hour? Express your answer to the nearest whole number.

The cost to build the Skywalk was \$40 million. When the Skywalk first opened, the entrance fee to walk out on the Skywalk was \$25 per person. If \$15 of each admission fee went towards paying for the construction of the Skywalk, and if the admission fee was never raised, how many visitors would need to pay the entrance fee to recover the cost of building the Skywalk? Express your answer to the nearest thousand.