**Lower Elementary:**

*Question:* Dorothy is riding her bicycle from a fortune teller’s caravan to her house. She can ride 8 miles in a whole hour. If it takes Dorothy half an hour to get home, then how far is it from the fortune teller’s caravan to her house?

**Upper Elementary:**

*Question:* The population of Munchkinland is 200 before Dorothy and Toto’s house hits the ground, landing on and squashing the Wicked Witch of the East. By what percent does the population increase when Dorothy and Toto arrive in Munchkinland? (Yes, we are counting Toto as a part of the population.)

**Middle School:**

*Question:* A winged monkey can fly 75 miles per hour in still conditions. If a winged monkey flies into the wind and is slowed down by 6,512 feet per minute, then what is the winged monkey’s new speed?

**Algebra and Up:**

*Question:* When Dorothy clicks her heels together, she pivots on the ball of each foot, thus forming a pair of 30 degree circular arcs with radii of 18 centimeters. Find the total distance traveled by Dorothy’s heels as she clicks them together 3 times. Assume she starts with her heels together, and round your answer to the nearest centimeter.

**Lower Elementary:**

*Question:* Dorothy is riding her bicycle from a fortune teller’s caravan to her house. She can ride 8 miles in a whole hour. If it takes Dorothy half an hour to get home, then how far is it from the fortune teller’s caravan to her house?

*Answer:* 4 miles

*Solution:* Since Dorothy can ride 8 miles in a whole hour, she can ride half as far in half an hour. So, since half of 8 is 4, Dorothy can ride 4 miles in half an hour. The fortune teller’s caravan is 4 miles away from her house.

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**Upper Elementary:**

*Question:* The population of Munchkinland is 200 before Dorothy and Toto’s house hits the ground, landing on and squashing the Wicked Witch of the East. By what percent does the population increase when Dorothy and Toto arrive in Munchkinland? (Yes, we are counting Toto as a part of the population.)

*Answer:* ½%

*Solution:* The population of Munchkinland increases by 1: we add 2 for Dorothy and Toto and subtract 1 for the squished witch. A percentage is out of 100. To turn 1 out of 200 into a percent, we divide both numbers by 2 and get 1/2 out of 100. That’s 1/2%.

**Middle School:**

*Question:* A winged monkey can fly 75 miles per hour in still conditions. If a winged monkey flies into the wind and is slowed down by 6,512 feet per minute, then what is the winged monkey’s new speed?

*Answer:* 1 mile per hour

*Solution:* To solve this problem, we start by converting 6,512 feet per minute to miles per hour. A mile is 5,280 feet, so 6,512 feet is 6,512/5,280 = 11,232/5,280 = 17/30 miles. Next, we find that 17/30 miles per minute × 60 minutes = 74 miles per hour. So, the winged monkey’s speed is 75 – 74 = 1 mile per hour.

**Algebra and Up:**

*Question:* When Dorothy clicks her heels together, she pivots on the ball of each foot, thus forming a pair of 30 degree circular arcs with radii of 18 centimeters. Find the total distance traveled by Dorothy’s heels as she clicks them together 3 times. Assume she starts with her heels together, and round your answer to the nearest centimeter.

*Answer:* 113 centimeters

*Solution:* For each click, Dorothy pivots her heels 30 degrees away from each other and then 30 degrees toward each other. That’s 60 degrees per foot per click, or 120 degrees total per click. When we multiply that by 3 clicks, we get 360 degrees—a full circle. So, to find the distance traveled by her heels, we find the circumference of a circle with an 18-centimeter radius: 2 × π × 18 centimeters ≈ 113 centimeters.