**Lower Elementary:**

*Question:* The year is 2018. A time traveler transports himself 40 years back in time, then 20 years forward in time, then 34 years back in time. What year is it for the time traveler now?

**Upper Elementary:**

*Question:* Rose works for Henrik’s department store where she makes $9.00 per hour. She begins her workday at 8:00 am and intends to work for 4 hours, but is interrupted at 9:30 am when aliens attack. How much more money would Rose make if she were able to work her full 4-hour shift?



**Middle School:**

*Question:* Mickey the mechanic can replace the tires on a car in 20 minutes. His friend Noel can replace the tires on a car in 25 minutes. If they work together and only one person can work on a tire at a time, how long will it take them to replace all 4 tires on a car?

**Algebra and Up:**

*Question:* The planet Gallifrey has a radius of about 3,000 miles. Earth has a radius of about 4,000 miles. How many cubic miles greater is the volume of Earth than the volume of Gallifrey? Round π to 3.14 and your answer to the nearest cubic mile.

**Lower Elementary:**

*Question:* The year is 2018. A time traveler transports himself 40 years back in time, then 20 years forward in time, then 34 years back in time. What year is it for the time traveler now?

*Answer:* 1964

*Solution:* Forty years before 2018 is 2018 – 40 = 1978. Twenty years after that is 1978 + 20 = 1998. Thirty-four years before that is 1998 – 34 = 1964. So, it is 1964 for the time traveler when he stops traveling through time.

**Upper Elementary:**

*Question:* Rose works for Henrik’s department store where she makes $9.00 per hour. She begins her workday at 8:00 am and intends to work for 4 hours, but is interrupted at 9:30 am when aliens attack. How much more money would Rose make if she were able to work her full 4-hour shift?

*Answer:* $22.50

*Solution:* Rose works for 11/2 hours from 8:00 am to 9:30 am instead of the 4 hours she intends to work. So, she misses 4 – 11/2 = 21/2 hours. In 21/2 hours, she would have made 21/2 × $9.00 = $22.50.



**Middle School:**

*Question:* Mickey the mechanic can replace the tires on a car in 20 minutes. His friend Noel can replace the tires on a car in 25 minutes. If they work together and only one person can work on a tire at a time, how long will it take them to replace all 4 tires on a car?

*Answer:* Either 121/2 or 12 minutes, depending on how you solve the problem

*Solution:* There are two ways to solve this problem. First, Mickey and Noel can each replace half of the wheels. Mickey can replace 4 wheels in 20 minutes, so he can replace 2 wheels in 10 minutes. Noel can replace 4 wheels in 25 minutes, so he can replace 2 wheels in 121/2 minutes. If they work at the same time, they’ll be done in 121/2 minutes. Alternatively, we can find out how long it would take them if Mickey takes over for Noel after 10 minutes, at which point Noel will be 10 ÷ 121/2 = 4/5 done with his half of the tires. Since Mickey can finish 2 tires in 10 minutes, he can finish the remaining 1/5 of Noel’s work in 1/5 × 10 = 2 minutes. So, if Mickey takes over, they can get the job done in 12 minutes.

**Algebra and Up:**

*Question:* The planet Gallifrey has a radius of about 3,000 miles. Earth has a radius of about 4,000 miles. How many cubic miles greater is the volume of Earth than the volume of Gallifrey? Round π to 3.14 and your answer to the nearest cubic mile.

*Answer:* 154,906,666,666 miles3

*Solution:* We use the formula 4/3π***r***3 to find the volume of each planet. Earth’s volume is approximately 267,946,666,666 miles3, and Gallifrey’s volume is 113,040,000,000 miles3. The difference is therefore 154,906,666,666 miles3.