
TEAMS Competition 2019

December Math Challenge Solutions

Story Problem 1

The National Safety Council estimated that there were 40,100 traffic accident related deaths in the US in 2017. Autonomous vehicles (AVs) have the potential to significantly reduce traffic accident related deaths.

If AVs decreased traffic accident related deaths by 75% in the first year of adoption, how many traffic accident-related deaths would result that year?

Solution = 10,028 traffic accident-related deaths

First determine the impact of a 75% reduction

$40,100 \text{ deaths} \times 0.75 = 30,075 \text{ fewer deaths after AVs introduced}$

Next determine the # of fatal accidents following the reduction

$40,100 \text{ deaths} - 30,075 \text{ deaths} = 10,028 \text{ traffic accident related deaths expected}$

Story Problem 2

Vehicle autonomy has the opportunity to increase overall vehicle fuel efficiency due to more efficient operation and communication between vehicles and infrastructure.

If the average fuel efficiency (in miles per gallon, MPG) increased from 20 MPG to 25 MPG, how many fewer gallons of gas would be required to complete a 400-mile trip?

Solution = 4 gallons

Determine number of gallons used to complete a 400-mile trip @ 20 MPG

$$\frac{400 \text{ miles}}{20 \frac{\text{miles}}{\text{gallon}}} = 20 \text{ gallons}$$

Determine number of gallons used to complete a 400-mile trip @ 25 MPG

$$\frac{400 \text{ miles}}{25 \frac{\text{miles}}{\text{gallon}}} = 16 \text{ gallons}$$

Determine the difference

$$20 \text{ gallons} - 16 \text{ gallons} = 4 \text{ gallons}$$