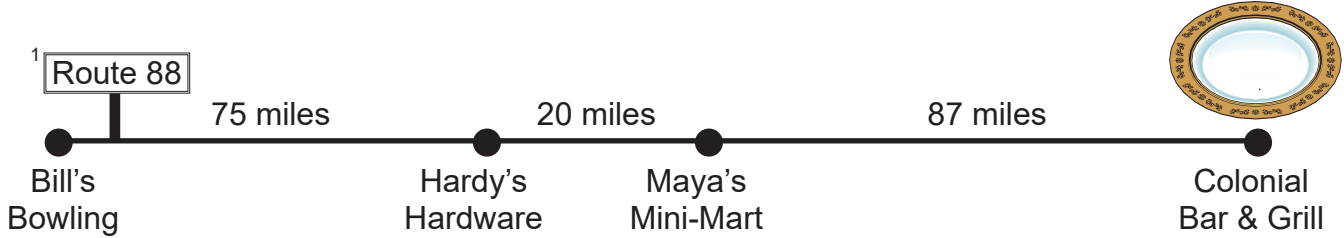


Read the case below to find the evidence to identify the innocent and guilty suspects. Remember, the story and suspects' statements are true.

### The Missing Plate on Route 88



<sup>2</sup>At 3:30 p.m. on Friday, police in Timberlake County arrest one of the four suspects below for stealing a signed Presidential Plate from the Colonial Bar & Grill on Route 88. <sup>3</sup>The plate went missing from the restaurant sometime after 9:00 a.m. on Friday. <sup>4</sup>Each suspect has his own car and traveled along Route 88 only by driving his car. <sup>5</sup>On the day the plate went missing, the only road each suspect traveled on was Route 88.

<sup>6</sup>The mileage of each car (how many miles driven per gallon of gasoline) is shown.

Car Owner	Car Mileage
John	35 miles per gallon of gasoline
Evan	25 miles per gallon of gasoline
Luke	40 miles per gallon of gasoline
Frank	30 miles per gallon of gasoline

<sup>8</sup>John was spotted at Hardy's Hardware at 11:00 a.m. <sup>9</sup>Evan was seen at Maya's Mini-Mart at 9:15 a.m. and at Bill's Bowling at 10:45 a.m. <sup>10</sup>Luke was with a friend at Bill's Bowling from 9:00 a.m. to 11:30 a.m. <sup>11</sup>Frank has receipts showing he was at Hardy's Hardware at 9:30 a.m. and Maya's Mini-Mart at 11:45 a.m. <sup>12</sup>None of the four suspects stopped for gas on Friday.

<sup>13</sup>The police interview each suspect somewhere along Route 88 on Friday. <sup>14</sup>After they listen to all four suspects' statements below, the police ask to search the car of one of the suspects, and then the suspect confesses to removing the Presidential Plate from the restaurant and pulls the plate from the trunk of his car.



**John**

<sup>15</sup>On Friday I was never more than 100 miles from Hardy's Hardware.



**Evan**

<sup>16</sup>My car used less than 7 gallons of gasoline on Friday.



**Luke**

<sup>17</sup>I am having car troubles and cannot drive faster than 40 mph.



**Frank**

<sup>18</sup>When I was at Hardy's earlier today my car had 12 gallons of gas. <sup>19</sup>It now has less than 7 gallons of gas.

Use mathematical reasoning to describe the best evidence for your conclusions. Refer to the sentence numbers, diagram, and table and show calculations when needed.

### The Innocent

Suspect Name: \_\_\_\_\_

Suspect Name: \_\_\_\_\_

Suspect Name: \_\_\_\_\_

### The Guilty

Suspect Name: \_\_\_\_\_

# Answers

## The Missing Plate on Route 88 (pages 2-3)



John



Evan



Luke



Frank

### The Innocent

**John:** John was never more than 100 miles from Hardy's Hardware on Friday [see 15]. The distance from Hardy's Hardware to the Colonial Bar & Grill is  $20 + 87 = 107$  miles [see 1], which is greater than 100 miles. So John could not have been at the Colonial Bar & Grill to remove the plate [see 14].

**Evan:** Evan used less than 7 gallons of gas on Friday [see 16] and his car travels 25 miles for each gallon of gas [see 7]. So on Friday, Evan drove less than  $7 \times 25 = 175$  miles. Evan was at Bill's Bowling on Friday [see 9] and the distance between Bill's Bowling and the Colonial Bar & Grill is  $75 + 20 + 87 = 182$  miles [see 1]. So Evan's car did not use enough gas for him to have driven his car on Route 88 from Bill's Bowling to the Colonial Bar & Grill. Since Evan only traveled by driving his car along Route 88 [see 4, 5], he could not have been at the restaurant to remove the plate [see 14].

**Luke:** From 9:00 a.m. to 11:30 a.m., Luke was at Bill's Bowling [see 10] and the arrest was made at 3:30 p.m. [see 2]. So for Luke to have removed the plate from the Colonial Bar & Grill he would need to have driven from Bill's Bowling to the restaurant in less than 4 hours (from 11:30 a.m. to 3:30 p.m.). Luke cannot drive his car faster than 40 mph [see 17], so in less than 4 hours Luke will have driven less than  $4 \times 40 = 160$  miles. However, the distance from Bill's Bowling to the Colonial Bar & Grill is 182 miles [see 1], which is further than Luke could have driven in 4 hours. Since Luke only traveled by driving his car along Route 88 [see 4, 5], he could not have been at the restaurant to remove the plate [see 14].

### The Guilty

**Frank:** Frank's car used at least 5 gallons of gas on Friday [see 18, 19]. Frank's car travels 30 miles for each gallon of gasoline [see 7], so Frank drove at least  $5 \times 30 = 150$  miles. Frank drove 20 miles from Hardy's Hardware to Maya's Mini-Mart [see 1, 11], so if he later drove to the Colonial Bar & Grill he would have traveled at least  $20 + 87 = 107$  miles on Friday. Since Frank drove at least 150 miles on Friday, it is possible that he was at the restaurant. One of the four suspects admitted to taking the plate when the police asked to search his car [see 14]. Since the other three suspects have been eliminated, Frank must have been the one who confessed to taking the plate.