

Comparing Car Rentals

You will need:

graph paper



This table gives the results of a phone survey of the cost of renting a mid-size car in a large city.

Company	Daily rate	“Free” miles	Cost per additional mile
A	\$34.99	150 miles	24 cents
B	\$26.95	100 miles	30 cents
C	\$39.95	100 miles	30 cents
D	\$41.95	unlimited mileage	—
E	\$27.99	unlimited mileage	—

- Exploration** Suppose you wanted to rent a car for a short trip and you had the information in the table. There is one car that is clearly the “best deal” in most cases. Which car is this? If this car were not available, how would you decide which car to rent? Write a paragraph explaining how you would decide. Include the following:

 - What things would you consider?
 - Show any calculations you would need to do to make your decision.
 - Is there any additional information not included in the table that you think you would need to know?

USING TABLES

- Which car do you think would be the best deal if you planned to drive a short distance? Which car would you rent to drive several hundred miles? Explain.

This table gives the cost of renting each car for one day to drive the indicated number of miles.

- Copy and complete the table, indicating how much it would cost to rent each car for the given miles.

Total Cost of Car Rental

Company	Miles driven				
	50	100	150	200	250
A	34.99	34.99	34.99	46.99	58.99
B	26.95	26.95	41.95	56.95	—
C	—	—	—	—	—
D	—	—	—	—	—
E	—	—	—	—	—

- Copy and complete the next table. It ranks each car according to the amount it would cost to rent it to drive the given number of miles. The code is **1** for least expensive and **5** for most expensive.

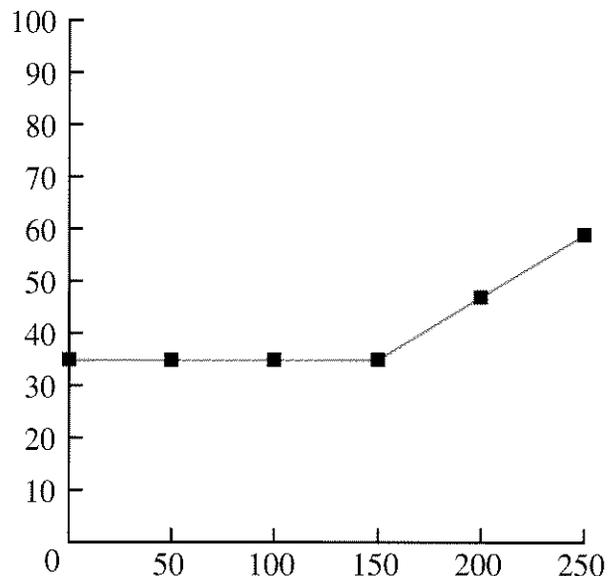
Company Rankings

Company	Miles driven				
	50	100	150	200	250
A	3	—	—	—	—
B	1	—	—	—	—
C	4	—	—	—	—
D	5	—	—	—	—
E	2	—	—	—	—

5. In the table you just completed, you can see that B is less expensive than A for 50 miles and 100 miles of travel, but this is reversed for 150 miles of travel.
- Which is less expensive for 125 miles of travel?
 - Show that the costs of A and B are almost exactly the same for 130 miles of travel.

USING GRAPHS

6. The graph above problem 7 shows, for a single day of rental, how the cost of renting a car from Company A varies as a function of the number of miles driven.
- Make an enlarged copy of the graph on your own paper.
 - Add to the same grid a similar graph for each of the other four companies. Your graphs must be accurate.



7. Two of the graphs should be horizontal lines. Which ones, and why?
8. According to your graphs, if you plan to drive 100 miles or less,
- which company is the most expensive?
 - which company is the least expensive?
9. Company A has a higher daily rate and lower mileage costs than Company B.
- Which of the two is more expensive for someone who travels 100 miles?
 - Which is more expensive for someone who travels 150 miles?
 - For what length trip is the cost of the two the same?
10. Company D has a slightly higher daily rate than Company C, but its mileage costs are zero.
- For what length trip is D cheaper?
 - For what length trip are they the same?

11. The graphs for B and D intersect at the point (150, 41.95).
- Label this point of intersection on your graph.
 - Label other points of intersection on any of the other graphs.
 - How would you interpret these points of intersection in terms of cost comparisons?
12. In what ways are tables better than graphs in helping you make a decision of this type? In what ways are graphs better?

USING EQUATIONS

Equations are useful if you want to use a computer or a programmable calculator to help you analyze a problem like this one. You can write an equation for the cost of renting a car from Company A for one day as a function of the number of miles traveled. Notice that the

graph has two parts: a horizontal part, and a part that slopes upward. The equation also has two parts.

If y is the cost in dollars and x is the number of miles driven, then:

$$y = 34.99 \quad \text{if } x \leq 150$$

$$y = 34.99 + 0.24(x - 150) \quad \text{if } x > 150$$

13. Which part of the equation represents the horizontal part of the graph?
14. Explain every part of the second equation. (Why is 150 subtracted from x ? Why are parentheses necessary? What is the meaning of the quantity in the parentheses? Why is it multiplied by 0.24? Why is the result added to 34.99? What is the meaning of the sum?)
15. Write equations for the costs of renting the other cars as a function of miles driven.

DISCOVERY GRADE AVERAGES

Mrs. Washman gives a quiz every Thursday. A student's current average at the end of any week can be computed by finding the ratio of *total correct points* to *total possible points* to date. The table shows Caden's scores.

	Q1	Q2	Q3	Q4	Q5
Correct	8	9	10	13	—
Possible	12	20	10	15	—

16. Find Caden's current average at the end of week 1, week 2, week 3, and week 4.

17. Caden found his current average by doing this computation:

$$\frac{8}{12} + \frac{9}{20} + \frac{10}{10} + \frac{13}{15} = \frac{40}{57}$$

Amiko said this was wrong because you don't add fractions by adding the numerators and adding the denominators. Who was right? Were they both right? Were they both wrong? Explain.

18. What would Caden's average be at the end of week 5 if Quiz 5 had
- 20 points, and he got 12 correct?
 - 40 points, and he got 80% correct?
 - 25 points, and he got N correct?