

Taxi!

Task

Lauren keeps records of the distances she travels in a taxi and what she pays:

Distance, d , in miles	Fare, F , in dollars
3	8.25
5	12.75
11	26.25

- If you graph the ordered pairs (d, F) from the table, they lie on a line. How can you tell this without graphing them?
- Show that the linear function in part (a) has equation $F = 2.25d + 1.5$.
- What do the 2.25 and the 1.5 in the equation represent in terms of taxi rides?

Commentary

This simple conceptual problem does not require algebraic manipulation, but requires students to articulate the reasoning behind each statement.

Solution

- The slope of the line segment connecting $(3, 8.25)$ and $(5, 12.75)$ is $\frac{(12.75-8.25)}{5-3} = 2.25$. The slope of the line segment connecting $(5, 12.75)$ and $(11, 26.25)$ is $\frac{(26.25-12.75)}{11-5} = 2.25$. Because the two line segments are connected and have the same slope, the three points lie on the same line.
- There is only one possible line in part (a), since two points determine a line. The graph of $F = 2.25d + 1.5$ is a line, so if we show that each ordered pair satisfies it then we will know that it is the same line as in part (a).

$$\begin{aligned}(3, 8.25) : 2.25(3) + 1.5 &= 8.25 \\ (5, 12.75) : 2.25(5) + 1.5 &= 12.75 \\ (11, 26.25) : 2.25(11) + 1.5 &= 26.25\end{aligned}$$

- The 2.25 represents the cost per mile for the ride. The 1.5 represents a fixed cost for every ride; it does not depend on the distance traveled.

