ALGEBRAIC WORD PROBLEM

Question:

Vivian and Noelle both leave the park at the same time, but in opposite directions. If Noelle travels five mph faster than Vivian and after 8 hours, they are 136 miles apart, how fast in mile per hour is each traveling?

Answer:

If Noelle travels 5 mph, it means in 8 hours, she would have traveled 40 more miles than Vivian since

$8 \times 5 = 40.$

If Vivian's speed is taken to be x mph, then the rate at which Noelle is traveling is

$(x + 5)$ mph.

Therefore;

$8 \times x = 8x$

and

$8x + 5 = 8x + 40$

The total distance traveled is the same as the product of the average speed and time taken.

Therefore, Vivian has traveled a distance of $8x$ miles, and Noelle a distance of $(8x + 40)$ miles.

Adding the two distances would give the total distance traveled by each, which is also the distance between them. $8x + 8x + 40 = 136$.

Simplifying the equation would provide $16x + 40 = 136$.

Minus 40 from both sides of the equation to give 16x=96.

$16x + 40 - 40 = 136 - 40$

$16x = 96$

Dividing both sides by 16 gives x=6.

$$\frac{16x}{16} = \frac{96}{16}$$

$x = 6$

Therefore, Vivian is traveling at a speed of 6 mph and Noelle at a rate of 6 mph+5 mph=11 mph.