

Lapping Racing Drivers

Good – or more dangerous – racing drivers are faster than other racing drivers. Towards the end of a race, the slower drivers may find themselves being lapped by other racing drivers who have completed one more circuit than they have.

If the speeds of the racing drivers are v and u with $v > u$, on a circuit of m miles, how long will it be before the faster driver laps the slower?



The faster driver travels $(v - u)$ mph faster than the slower. Suppose the time for the slower driver to be lapped is t hours, then the faster driver will have travelled m miles further.

We can use the equation $\text{time} = \frac{\text{distance}}{\text{speed}}$, with $\text{distance} = m$ and speed equal to the relative speed of the drivers,

$$(v - u) \text{ to give } \text{time} = \frac{m}{(v - u)}.$$

Suppose that $m = 10$ and $v = 100, u = 95$.

$$t = \frac{10}{(100 - 95)} = \frac{10}{5} = 2 \text{ hours.}$$

The time for the slower driver to be lapped is then