



Name

Pretest

In the picture below, two airplanes are flying on the same route.

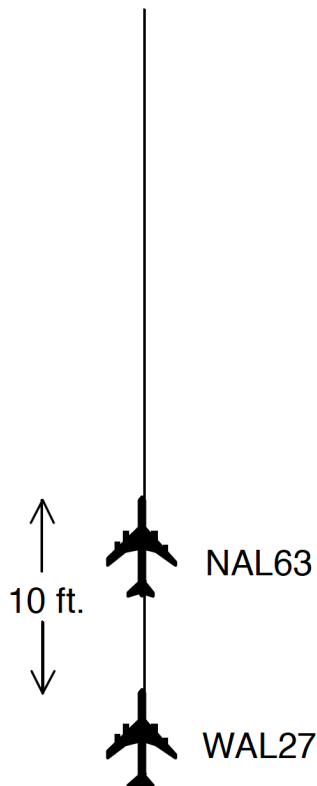
The World Airlines plane has flight number **WAL27**.
The speed of Flight WAL27 is $\frac{1}{2}$ foot/second.

The National Airlines plane has flight number **NAL63**.
The speed of Flight NAL63 is $\frac{1}{4}$ foot/second.

Flight WAL27 is at the start of the route (0 feet).
Flight NAL63 is 10 feet ahead of the route start.

1. How many seconds will it take WAL27 to close the 10-foot gap and catch up with NAL63?

Explain your reasoning. _____





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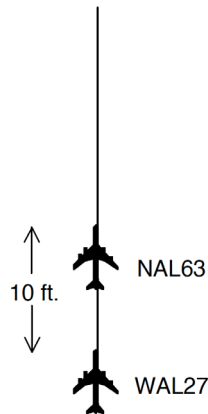
Posttest

In the picture below, two airplanes are flying on the same route.

The speed of Flight WAL27 is 1 foot/second.

The speed of Flight NAL63 is $\frac{2}{3}$ foot/second.

Flight NAL63 is 10 feet ahead of Flight WAL27.



1. How many seconds will it take Flight WAL27 to close the gap from 10 feet to 5 feet? That is how many seconds will a separation violation occur?

2. What is the difference in speed between Flight WAL27 and Flight NAL63? That is, how many feet per second faster is the speed of the trailing plane than the speed of the leading plane?



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3. How fast is Flight WAL27 closing the gap between the planes?
That is, the distance between the planes changes how many feet each second?

4. What is the relationship between the difference in speeds and the speed at which Flight WAL27 is closing the gap?

5. The speed of Flight WAL27 is $\frac{1}{2}$ foot per second. Now suppose the speed of Flight WAL27 were $\frac{3}{4}$ foot per second. With the new faster speed, at how many feet per second would Flight WAL27 close the gap? With the new faster speed, how many seconds will it take to close the gap from 10 feet to 5 feet?

6. What would you tell the air traffic controllers to do to be sure the planes always meet the separation standard?

Now consider this general problem.

Two planes are traveling at different speeds on the same route.
The trailing plane is traveling faster than the leading plane.

7. Do you have enough information to predict how long it will take the trailing plane to close one-half of the starting gap between the planes? Why or why not?



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8. Now suppose the difference in speeds is twice as great. What would you expect to happen to the amount of time it would take the trailing plane to close one-half of the starting gap between the planes? Why?

9. Finally, suppose that the planes each travel at their original speeds, but the distance between the planes is twice as great. What would you expect to happen to the amount of time it would take the trailing plane to close one-half of the new starting gap between the planes? Why?



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Lines and Grid

