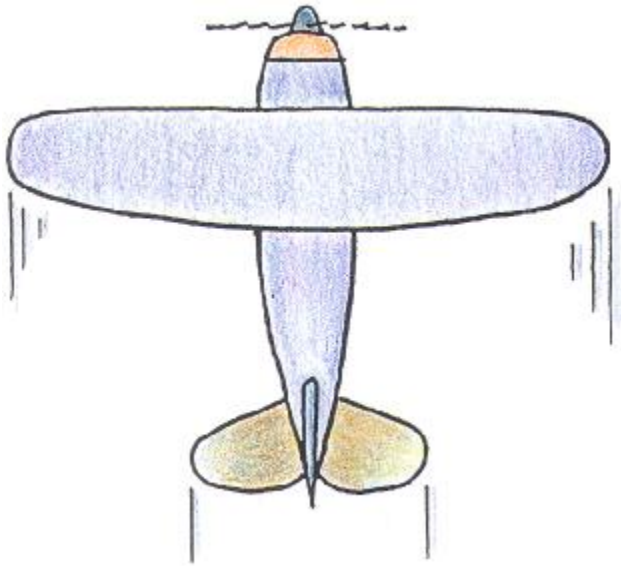
NEXT-TIME QUESTION

The speed of an airplane relative to the ground is affected by wind. When an airplane flies in the direction of a wind (tailwind), it has a greater groundspeed. When an airplane flies directly into wind (headwind), it has a smaller groundspeed.



Suppose an airplane is blown off course by a 90-degree crosswind (keeping the nose pointing in a direction perpendicular to the wind direction). Will its groundspeed be more, less, or the same as in still air?

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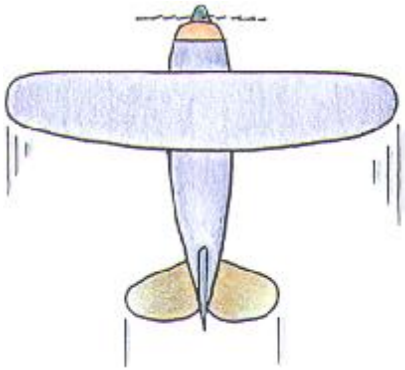

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Answer: More.

When directions as well as magnitudes of speeds are considered, we're into vectors. The resulting speed can be found by finding the resultant velocity via vector rules. The diagram shows a sample vector that represents the magnitude and direction of the airspeed, and another that represents the velocity of wind speed. The resultant is the diagonal of the parallelogram so formed. In this case, the parallelogram is a rectangle. The Pythagorean Theorem ($c^2 = a^2 + b^2$) gives the magnitude of the resultant. The angle can be found with a protractor, or a bit of trigonometry.