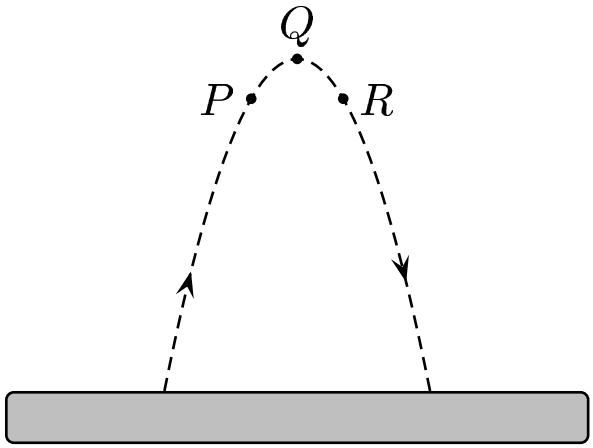
A ball is thrown and follows the parabolic path shown. Air friction is negligible. Point Q is the highest point on the path. Points P and R are the same height above the ground.



How do the speeds of the ball at the three points compare?

A) $\|\vec{v}_Q\| < \|\vec{v}_R\| < \|\vec{v}_P\|$
B) $\|\vec{v}_P\| < \|\vec{v}_Q\| < \|\vec{v}_R\|$
C) $\|\vec{v}_R\| < \|\vec{v}_Q\| < \|\vec{v}_P\|$
D) $\|\vec{v}_Q\| < \|\vec{v}_P\| = \|\vec{v}_R\|$
E) $\|\vec{v}_P\| = \|\vec{v}_R\| < \|\vec{v}_Q\|$

The speed of the ball in the x-direction is constant. Because of gravitational acceleration, the speed in the y-direction goes to zero at point Q. Since points P and R are located at the same point above ground, by symmetry we see that they have the same speed in the y-direction (though they do not have the same velocity). The answer is then "$v_Q < v_P = v_R$".

Answer **D**.