A light elastic string has natural length $a$ and modulus of elasticity $4mg$. One end of the string is fixed to a point $O$ on a smooth horizontal surface. A particle $P$ of mass $m$ is attached to the other end of the string. The particle $P$ is projected along the surface in the direction $OP$. When the length of the string is $\frac{5}{4}a$, the speed of $P$ is $v$. When the length of the string is $\frac{3}{2}a$, the speed of $P$ is $\frac{1}{2}v$.

**(a)** Find an expression for $v$ in terms of $a$ and $g$. [4]

**(b)** Find, in terms of $g$, the acceleration of $P$ when the stretched length of the string is $\frac{3}{2}a$. [2]