Question 36011

Let a denote the acceleration due to gravity on the planet. If objects initial velocity was zero, then law of motion is $y(t)=h-\frac{at^2}{2}$. If $y(t)=0$ (object has already fallen), then

$h=\frac{at^2}{2}\Rightarrow a=\frac{2h}{t^2}=\frac{2\cdot 54\,m}{3^2 s^2}=12\frac{m}{s^2}$.

Hence, acceleration due to gravity on the planet is $a=12\frac{m}{s^2}$.