Velocity of a Planet in Terms of Eccentricity.

Applying the law of conservation of angular momentum at perigee and apogee

$$mv_p r_p = mv_a r_a$$

$\Rightarrow$ $$\frac{v_p}{v_a} = \frac{r_a}{r_p} = \frac{a+c}{a-c} = \frac{1+e}{1-e}$$ [As $r_p = a - c,\quad r_a = a + c$ and eccentricity $e = \frac{c}{a}$]

Applying the conservation of mechanical energy at perigee and apogee

$$\frac{1}{2}mv_p^2 - \frac{GMm}{r_p} = \frac{1}{2}mv_a^2 - \frac{GMm}{r_a} \Rightarrow v_p^2 - v_a^2 = 2GM\left[\frac{1}{r_p} - \frac{1}{r_a}\right]$$

$\Rightarrow$ $$v_a^2\left[\frac{r_a^2 - r_p^2}{r_p^2}\right] = 2GM\left[\frac{r_a - r_p}{r_a r_p}\right]$$ [As $v_p = \frac{v_a r_a}{r_p}$]

$\Rightarrow$ $$v_a^2 = \frac{2GM}{r_a + r_p}\left[\frac{r_p}{r_a}\right] \Rightarrow v_a^2 = \frac{2GM}{a}\left(\frac{a-c}{a+c}\right) = \frac{2GM}{a}\left(\frac{1-e}{1+e}\right)$$

Thus the speeds of planet at apogee and perigee are

$$v_a = \sqrt{\frac{2GM}{a}\left(\frac{1-e}{1+e}\right)}, \qquad v_p = \sqrt{\frac{2GM}{a}\left(\frac{1+e}{1-e}\right)}$$

Note: The gravitational force is a central force so torque on planet relative to sun is always zero, hence angular momentum of a planet or satellite is always constant irrespective of shape of orbit.