

$$7) \quad a) t_1 = 1.67 \times 10^7 \text{ years}$$

$$b) t_2 = 5.36 \times 10^4 \text{ years}$$

$$8) \quad a) t_1 = 9.83 \times 10^6$$

$$b) t_2 = 5.81 \times 10^6$$

$$9) \quad a) v_1 = 124.88 \text{ k}$$

$$v_2 = 34.69$$

$$b) v_3 = 77.66 \text{ r}$$

$$10) \quad a) t_1 = 9,600 \text{ y}$$

$$b) t_2 = 4.02 \times 10^4 \text{ y}$$

$$12) \quad t = 0.061 \text{ s}$$

$$14) \quad a) \quad \vec{v}_1 = 6 \text{ m}$$

$$\vec{v}_2 = -1.71 \text{ m/s}$$

$$\vec{v}_3 = 4.04 \text{ m/s}$$

$$b) \quad \vec{v}_{\text{ave.}} = 3.49 \text{ m/s}$$

$$c) \quad \vec{v}_1 = 13.43 \text{ m/s}$$

$$\vec{v}_2 = -3.83 \text{ m/s}$$

$$\vec{v}_3 = 7.81 \text{ m/s}$$

$$v_{\text{ave}} = 4.13 \text{ m/s}$$