1.

$$\lim_{x\to a} \frac{\sqrt{2a^3x-x^4} - a\sqrt[3]{a^2x}}{a-\sqrt[4]{ax^3}}$$ ← Form $\frac{0}{0}$

$$= \lim_{x\to a} \frac{\dfrac{2a^3-4x^3}{2\sqrt{2a^3x-x^4}} - \dfrac{1}{3}a^{5/3}x^{-2/3}}{-\dfrac{3}{4}a^{1/4}x^{-1/4}}$$

$$= \frac{\dfrac{-2a^3}{2a^2} - \dfrac{1}{3}a}{\dfrac{-3}{4}}$$

$$= \left(\frac{-4}{3}\right)\left(-a - \frac{1}{3}a\right)$$

$$= \frac{16}{9}a$$

2. $$\lim_{x\to 0} (e^x+5x)^{1/x}$$ ← Form 1^∞

$$L = \lim_{x\to 0} \frac{1}{x}\cdot \ln(e^x+5x)$$

$$= \lim_{x\to 0} \frac{\ln(e^x+5x)}{x}$$ ← Form $\frac{0}{0}$

$$= \lim_{x\to 0} \frac{\dfrac{e^x+5}{e^x+5x}}{1}$$

$$= \frac{1+5}{1+0}$$

$$= 6$$

Hence

$$\lim_{x\to 0} (e^x+5x)^{1/x} = e^6.$$

L28 P3