(1) [7] Evaluate the improper integral

$$I = \int_{-2}^{14} \frac{1}{\sqrt[4]{x+2}}\,dx$$

making proper use of any required limits.

$$I = \lim_{t \to -2^+} \int_t^{14} (x+2)^{-\frac{1}{4}}\,dx$$

$$= \lim_{t \to -2^+} \frac{4}{3}\Big[(x+2)^{3/4}\Big]_t^{14}$$

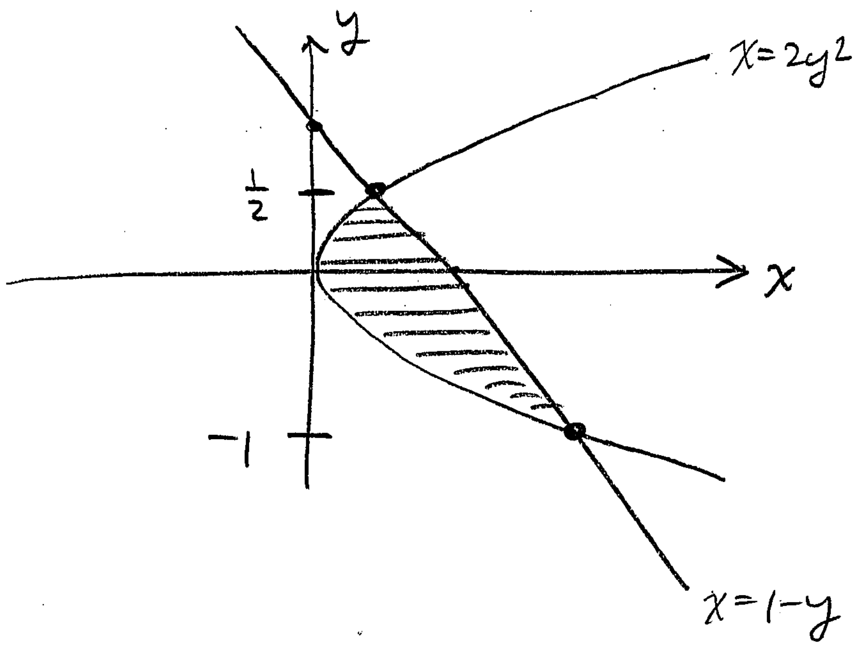
$$= \lim_{t \to -2^+} \frac{4}{3}\Big[16^{3/4} - (t+2)^{3/4}\Big]$$

$$= \left(\frac{4}{3}\right)\Big[\left(16^{\frac{1}{4}}\right)^3 - 0\Big]$$

$$= \frac{4^4}{3}$$

$$= \boxed{\frac{256}{3}}$$

(2) [8] Determine the area enclosed by the curves $x = 2y^2$ and $x + y = 1$.



$$\left.\begin{array}{l} x=2y^2 \\ x+y=1 \end{array}\right\} \Rightarrow \quad 2y^2+y-1=0$$

$$y=\frac{-1\pm\sqrt{1-4(2)(-1)}}{2(2)}$$

$$=\frac{-1\pm 3}{4}$$

$$=\frac{1}{2}\ ,\ -1$$

$$\therefore \text{ area } \quad A=\int_{y=-1}^{y=1/2}(1-y)-(2y^2)\,dy$$

$$=\left[y-\frac{y^2}{2}-\frac{2}{3}y^3\right]_{-1}^{\frac{1}{2}}$$

$$=\left(\frac{1}{2}-\frac{1}{8}-\frac{1}{12}\right)-\left(-1-\frac{1}{2}+\frac{2}{3}\right)$$

$$=\frac{12-3-2+24+12-16}{24} \quad = \boxed{\frac{27}{24}}$$