103.

$$\int_4^9 \frac{\sqrt{x}-1}{\sqrt{x}+2}dx \quad \left| \begin{array}{l} \sqrt{x}+2=t \\ x=(t-2)^2 \\ dx=2t(t-2)dt \end{array} \right|$$

$$\int \frac{\sqrt{x}-1}{\sqrt{x}+2}dx = \int \frac{(t-3)\cdot 2t(t-2)}{t}dt =$$

$$= 2\int (t^2-5t+6)dt = \frac{2}{3}t^3-5t^2+12t+C =$$

$$= \frac{2}{3}\left(\sqrt{x}+2\right)^3-5\left(\sqrt{x}+2\right)^2+12\left(\sqrt{x}+2\right)+C$$

$$\int_4^9 \frac{\sqrt{x}-1}{\sqrt{x}+2}dx = \frac{2}{3}\left(\sqrt{x}+2\right)^3-5\left(\sqrt{x}+2\right)^2+12\left(\sqrt{x}+2\right)\Big|_4^9 =$$

$$= \frac{250}{3}-125+60-\frac{128}{3}+80-48=\frac{23}{3}$$

104.

$$\int_2^8 \frac{2xdx}{\sqrt[3]{x}+1}$$

$$\sqrt[3]{x}=t$$

$$x=t^3$$

$$dx=2t^2dt$$

$$\int \frac{2xdx}{\sqrt[3]{x}+1} = 4\int \frac{t^5}{t+1}dt = 4\int \frac{t^5}{t+1}dt = 4\int \left(t^4-t^3+t^2-t+1-\frac{1}{t+1}\right)dt =$$

$$= \frac{4}{5}t^5-t^4+\frac{4}{3}t^3-2t^2+4t-4\ln|t+1|+C$$

$$\int_2^8 \frac{2xdx}{\sqrt[3]{x}+1} = \left(\frac{4}{5}x^{\frac{5}{3}}-x^{\frac{4}{3}}+\frac{4}{3}x-2x^{\frac{2}{3}}+4x^{\frac{1}{3}}-4\ln\left|x^{\frac{1}{3}}+1\right|\right)\Bigg|_2^8 =$$

$$= \frac{88}{5}+\frac{2}{5}\sqrt[3]{4}-2\sqrt[3]{2}-4\ln 3+4\ln\left(\sqrt{2}+1\right)$$