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$$\lim_{x \rightarrow \sqrt{r}} \frac{-1}{\sqrt{r} - 2a + b} = -\infty \Rightarrow \begin{cases} \sqrt{r} - 2a + b = 0 \\ -\frac{a}{\sqrt{r}} = r \end{cases} \xrightarrow{a = -\sqrt{r}} b = \sqrt{r} \Rightarrow \boxed{a+b=0} \checkmark$$

(1)

$$\Rightarrow x^{\sqrt{r}} + ax + b = 0^+ \Rightarrow (x - \sqrt[3]{r})^2 \rightarrow x^{\sqrt{r}} - \sqrt[3]{r} x + \sqrt[3]{r} \Rightarrow a = -\sqrt[3]{r} \sqrt[3]{r}$$

(2)

$$\Rightarrow \begin{bmatrix} \sqrt[3]{r} \sqrt[3]{r} \\ -\sqrt[3]{r} \sqrt[3]{r} \end{bmatrix} \rightarrow \begin{bmatrix} \sqrt[3]{r} \\ -\sqrt[3]{r} \end{bmatrix} = \boxed{-1} \checkmark$$

(2)

$$\lim_{x \rightarrow -\frac{1}{\sqrt{r}}} \frac{-1+a}{|\frac{1}{\sqrt{r}}+a|+a} = -\infty \rightarrow \begin{cases} \text{مخرج} < 0 \\ \text{مخرج} > 0 \end{cases}$$

$$a = -\frac{1}{4} \Rightarrow \boxed{-\frac{1}{4}} = \boxed{-1} \checkmark$$

(3)

$$\lim_{x \rightarrow -\frac{1}{\sqrt{r}}} \frac{14x+4}{\sqrt[3]{r}x+11} \rightarrow \frac{-14+4}{-11+\frac{11}{\sqrt{r}}} = \frac{1}{0^+} = \boxed{+\infty} \checkmark$$

(4)

$$\lim_{x \rightarrow \sqrt{r}} \frac{x^{\sqrt{r}} - \sqrt{r}}{x^{\sqrt{r}} - 1} \Rightarrow \lim_{x \rightarrow \sqrt{r}} \frac{(x-\sqrt{r})(x+\sqrt{r})}{(x-\sqrt{r})(x^{\sqrt{r}} + \sqrt{r}x)} \Rightarrow \frac{\sqrt{r}}{1\sqrt{r}} = \boxed{\frac{1}{\sqrt{r}}} \checkmark$$

(5)

$$\lim_{x \rightarrow -1} \frac{x^{\sqrt{r}} + 10x + 4}{1\sqrt{r} + 4\sqrt[3]{r}x} \xrightarrow{\frac{0}{0}} \lim_{x \rightarrow -1} \frac{(x+1)(x+\sqrt{r})}{4(x+\sqrt{r})} = \lim_{x \rightarrow -1} \frac{(1+\sqrt[3]{r})(1+\sqrt[3]{r} - \sqrt[3]{r})(x+\sqrt{r})}{4(1+\sqrt[3]{r})}$$

(6)

$$\frac{(1+1+1)(1-1)}{4} = \boxed{-\frac{1}{4}} \checkmark$$

(2)

$$1 - \cos x = 1 - \sin^2 \frac{x}{p} \Rightarrow \lim_{x \rightarrow 0} \frac{\sqrt{1 + \frac{x}{p}} - \sqrt{1 - \frac{x}{p}}}{\sqrt{1 - \cos x}} \stackrel{0}{=} \lim_{x \rightarrow 0} \frac{\sqrt{1 + \frac{x}{p}} - \sqrt{1 - \frac{x}{p}}}{\sqrt{1 - \sin^2 \frac{x}{p}}} \stackrel{0}{=} \lim_{x \rightarrow 0} \frac{\sqrt{1 + \frac{x}{p}} - \sqrt{1 - \frac{x}{p}}}{\sqrt{1 - \frac{x^2}{p^2}}}$$

hop $\rightarrow \frac{\frac{-\frac{1}{p}}{\sqrt{1 - \frac{x}{p}}} + \frac{\frac{1}{p}}{\sqrt{1 - \frac{x}{p}}}}{\frac{\sqrt{1 - \frac{x^2}{p^2}}}{\frac{1}{p}}} \xrightarrow{x \rightarrow 0} \frac{\frac{-1}{\sqrt{p}} + \frac{1}{\sqrt{p}}}{\frac{\sqrt{p}}{p}} = \frac{\frac{p}{\sqrt{p}}}{\frac{\sqrt{p}}{p}} = \frac{p}{p} = 1$

$$\lim_{x \rightarrow 0} \frac{k + 1 - \frac{ax^p}{p}}{kx^p} \Rightarrow \lim_{x \rightarrow 0} \frac{pk + p - ax^p}{pkx^p} = p \Rightarrow \boxed{k = -1}, \boxed{a = 9} \Rightarrow \frac{9}{k} = -9$$

$$\lim_{x \rightarrow a^+} \frac{p\sqrt{x-a} + p(\sqrt{x-a}\sqrt{x+a})}{\sqrt{x-a}\sqrt{x+a}} = \lim_{x \rightarrow a^+} \frac{p\sqrt{x-a}}{\sqrt{x-a}\sqrt{x+a}} + \lim_{x \rightarrow a^+} \frac{p(\sqrt{x-a})(\sqrt{x+a})}{(\sqrt{x-a})(\sqrt{x-a})(\sqrt{x+a})}$$

$$\lim_{x \rightarrow a^+} \frac{p}{\sqrt{x+a}} + \lim_{x \rightarrow a^+} \frac{p(\sqrt{x-a})(\sqrt{x+a})}{(\sqrt{x-a})(\sqrt{x+a})(\sqrt{x+a})} = \frac{p}{\sqrt{4a}} + 0 = \frac{p}{\sqrt{4a}}$$

$$\lim_{x \rightarrow -1} \frac{1 - k[x]}{x^p - 1} \begin{cases} \rightarrow -1^+ \rightarrow \frac{1+k}{0^-} = -\infty \Rightarrow 1+k > 0 \\ \rightarrow -1^- \rightarrow \frac{1+pk}{0^+} = -\infty \Rightarrow 1+pk < 0 \end{cases}$$

$$\rightarrow -1 < k < 0$$

$$\Rightarrow \left(k\pi, \cos k\pi \right) \rightarrow \frac{p}{\sqrt{4a}}$$

$$\lim_{n \rightarrow 0} \frac{\sqrt{r+r_n} - \sqrt{r-n}}{\sqrt{1-\cos n}} \times \frac{\sqrt{r+r_n} + \sqrt{r-n}}{\sqrt{r+r_n} + \sqrt{r-n}} \times \frac{\sqrt{1+\cos n}}{\sqrt{1+\cos n}} =$$


$$\lim_{n \rightarrow 0} \frac{r_n \times \sqrt{r}}{\sqrt{1-\cos n}} \times \frac{1}{r\sqrt{r}} = \lim_{n \rightarrow 0} \frac{r\sqrt{r} \cdot n}{|\sin n| r\sqrt{r}} = r \times \frac{n}{-\sin n} = \boxed{-r}$$