728.1. $\frac{d}{dx}\operatorname{Arsh}\frac{x}{a}=\frac{1}{\sqrt{x^2+a^2}}$.

728.2. $\frac{d}{dx}\operatorname{Arch}\frac{x}{a}=\frac{1}{\sqrt{x^2-a^2}}$ $\left[\operatorname{Arch}\frac{x}{a}>0,\ \frac{x}{a}>1\right]$.

728.3. $\frac{d}{dx}\operatorname{Arch}\frac{x}{a}=\frac{-1}{\sqrt{x^2-a^2}}$ $\left[\operatorname{Arch}\frac{x}{a}<0,\ \frac{x}{a}>1\right]$.

728.4. $\frac{d}{dx}\operatorname{Arth}\frac{x}{a}=\frac{a}{a^2-x^2}$ $[x^2<a^2]$.

728.5. $\frac{d}{dx}\operatorname{Arcth}\frac{x}{a}=\frac{a}{a^2-x^2}$ $[x^2>a^2]$.

728.6. $\frac{d}{dx}\operatorname{Arsech}\frac{x}{a}=\frac{-a}{x\sqrt{a^2-x^2}}$ $\left[\operatorname{Arsech}\frac{x}{a}>0,\ 0<\frac{x}{a}<1\right]$.

728.7. $\frac{d}{dx}\operatorname{Arsech}\frac{x}{a}=\frac{a}{x\sqrt{a^2-x^2}}$ $\left[\operatorname{Arsech}\frac{x}{a}<0,\ 0<\frac{x}{a}<1\right]$.

728.8. $\frac{d}{dx}\operatorname{Arcsch}\frac{x}{a}=\frac{-a}{x\sqrt{x^2+a^2}}$.

(Всюду, кроме 728.4 и 728.5, a должно быть положительным.)

Обратные гиперболические функции — Интегралы

Здесь всюду $a>0$

730. $\int \operatorname{Arsh}\frac{x}{a}\,dx=x\operatorname{Arsh}\frac{x}{a}-\sqrt{x^2+a^2}$.

730.1. $\int x\operatorname{Arsh}\frac{x}{a}\,dx=\left(\frac{x^2}{2}+\frac{a^2}{4}\right)\operatorname{Arsh}\frac{x}{a}-\frac{x}{4}\sqrt{x^2+a^2}$.

730.2. $\int x^2\operatorname{Arsh}\frac{x}{a}\,dx=\frac{x^3}{3}\operatorname{Arsh}\frac{x}{a}+\frac{2a^2-x^2}{9}\sqrt{x^2+a^2}$.

730.3. $\int x^3\operatorname{Arsh}\frac{x}{a}\,dx=$

$=\left(\frac{x^4}{4}-\frac{3a^4}{32}\right)\operatorname{Arsh}\frac{x}{a}+\frac{3a^2x-2x^3}{32}\sqrt{x^2+a^2}$.

730.4. $\int x^4\operatorname{Arsh}\frac{x}{a}\,dx=$

$=\frac{x^5}{5}\operatorname{Arsh}\frac{x}{a}-\frac{8a^4-4a^2x^2+3x^4}{75}\sqrt{x^2+a^2}$.

[См. **625 — 625.4.**]

730.9. $\int x^p\operatorname{Arsh}\frac{x}{a}dx=\frac{x^{p+1}}{p+1}\operatorname{Arsh}\frac{x}{a}-\frac{1}{p+1}\int\frac{x^{p+1}dx}{\sqrt{x^2+a^2}}$ $[p\neq-1]$.

[См. **201.01 — 207.01** и **625.9.**]

731.1. $\int\frac{1}{x}\operatorname{Arsh}\frac{x}{a}\,dx=$

$=-\frac{1}{2}\left(\ln\left|\frac{2x}{a}\right|\right)^2+\frac{1}{2^2}\frac{a^2}{x^2}-\frac{1\cdot3}{2\cdot4^2}\frac{a^4}{x^4}+\frac{1\cdot3\cdot5}{2\cdot4\cdot6^2}\frac{a^6}{x^6}-\dots$

$\left[\frac{x}{a}<-1\right]$,

$=\frac{x}{a}-\frac{1}{2\cdot3\cdot3}\frac{x^3}{a^3}+\frac{1\cdot3}{2\cdot4\cdot5\cdot5}\frac{x^5}{a^5}-\frac{1\cdot3\cdot5}{2\cdot4\cdot6\cdot7\cdot7}\frac{x^7}{a^7}+\dots$ $[x^2<a^2]$.

$=\frac{1}{2}\left(\ln\frac{2x}{a}\right)^2-\frac{1}{2^2}\frac{a^2}{x^2}+\frac{1\cdot3}{2\cdot4^2}\frac{a^4}{x^4}-\frac{1\cdot3\cdot5}{2\cdot4\cdot6^2}\frac{a^6}{x^6}+\dots$ $\left[\frac{x}{a}>1\right]$,

731.2. $$\int \frac{1}{x^2}\operatorname{Arsh}\frac{x}{a}\,dx = -\frac{1}{x}\operatorname{Arsh}\frac{x}{a} - \frac{1}{a}\ln\left|\frac{a+\sqrt{x^2+a^2}}{x}\right|.$$

731.3. $$\int \frac{1}{x^3}\operatorname{Arsh}\frac{x}{a}\,dx = -\frac{1}{2x^2}\operatorname{Arsh}\frac{x}{a} - \frac{\sqrt{x^2+a^2}}{2a^2x}.$$

[См. **626.1—626.3.**]

731.9. $$\int \frac{1}{x^p}\operatorname{Arsh}\frac{x}{a}\,dx = -\frac{1}{(p-1)\,x^{p-1}}\operatorname{Arsh}\frac{x}{a} + \frac{1}{p-1}\int \frac{dx}{x^{p-1}\sqrt{x^2+a^2}} \qquad [p\neq 1].$$

[См. **221.01—226.01** и **626.9.**]

732. $$\int \operatorname{Arch}\frac{x}{a}\,dx = x\operatorname{Arch}\frac{x}{a} - \sqrt{x^2-a^2} \qquad \left[\operatorname{Arch}\frac{x}{a} > 0\right],$$
$$= x\operatorname{Arch}\frac{x}{a} + \sqrt{x^2-a^2} \qquad \left[\operatorname{Arch}\frac{x}{a} < 0\right].$$

732.1. $$\int x\operatorname{Arch}\frac{x}{a}\,dx = \left(\frac{x^2}{2}-\frac{a^2}{4}\right)\operatorname{Arch}\frac{x}{a} - \frac{x}{4}\sqrt{x^2-a^2} \qquad \left[\operatorname{Arch}\frac{x}{a} > 0\right],$$
$$= \left(\frac{x^2}{2}-\frac{a^2}{4}\right)\operatorname{Arch}\frac{x}{a} + \frac{x}{4}\sqrt{x^2-a^2} \qquad \left[\operatorname{Arch}\frac{x}{a} < 0\right].$$

732.2. $$\int x^2\operatorname{Arch}\frac{x}{a}\,dx = \frac{x^3}{3}\operatorname{Arch}\frac{x}{a} - \frac{2a^2+x^2}{9}\sqrt{x^2-a^2} \qquad \left[\operatorname{Arch}\frac{x}{a} > 0\right],$$
$$= \frac{x^3}{3}\operatorname{Arch}\frac{x}{a} + \frac{2a^2+x^2}{9}\sqrt{x^2-a^2} \qquad \left[\operatorname{Arch}\frac{x}{a} < 0\right].$$

732.3. $$\int x^3\operatorname{Arch}\frac{x}{a}\,dx = \left(\frac{x^4}{4}-\frac{3a^4}{32}\right)\operatorname{Arch}\frac{x}{a} - \frac{3a^2x+2x^3}{32}\sqrt{x^2-a^2} \qquad \left[\operatorname{Arch}\frac{x}{a} > 0\right],$$
$$= \left(\frac{x^4}{4}-\frac{3a^4}{32}\right)\operatorname{Arch}\frac{x}{a} + \frac{3a^2x+2x^3}{32}\sqrt{x^2-a^2} \qquad \left[\operatorname{Arch}\frac{x}{a} < 0\right].$$

732.4. $$\int x^4 \operatorname{Arch}\frac{x}{a}\,dx =$$

$$= \frac{x^5}{5}\operatorname{Arch}\frac{x}{a} - \frac{8a^4+4a^2x^2+3x^4}{75}\sqrt{x^2-a^2} \quad \left[\operatorname{Arch}\frac{x}{a}>0\right],$$

$$= \frac{x^5}{5}\operatorname{Arch}\frac{x}{a} + \frac{8a^4+4a^2x^2+3x^4}{75}\sqrt{x^2-a^2} \quad \left[\operatorname{Arch}\frac{x}{a}<0\right].$$

[См. **627—627.4.**]

732.9. $$\int x^p \operatorname{Arch}\frac{x}{a}\,dx =$$

$$= \frac{x^{p+1}}{p+1}\operatorname{Arch}\frac{x}{a} - \frac{1}{p+1}\int \frac{x^{p+1}\,dx}{\sqrt{x^2-a^2}} \quad \left[\operatorname{Arch}\frac{x}{a}>0,\ p\neq -1\right],$$

$$= \frac{x^{p+1}}{p+1}\operatorname{Arch}\frac{x}{a} + \frac{1}{p+1}\int \frac{x^{p+1}\,dx}{\sqrt{x^2-a^2}} \quad \left[\operatorname{Arch}\frac{x}{a}<0,\ p\neq -1\right].$$

[См. **261.01—267.01** и **627.9.**]

733.1. $$\int \frac{1}{x}\operatorname{Arch}\frac{x}{a}\,dx =$$

$$= \frac{1}{2}\left(\ln\frac{2x}{a}\right)^2 + \frac{1}{2^3}\frac{a^2}{x^2} + \frac{1\cdot 3}{2\cdot 4^3}\frac{a^4}{x^4} + \frac{1\cdot 3\cdot 5}{2\cdot 4\cdot 6^3}\frac{a^6}{x^6} + \ldots \quad \left[\operatorname{Arch}\frac{x}{a}>0\right],$$

$$= -\left[\frac{1}{2}\left(\ln\frac{2x}{a}\right)^2 + \frac{1}{2^3}\frac{a^2}{x^2} + \frac{1\cdot 3}{2\cdot 4^3}\frac{a^4}{x^4} + \frac{1\cdot 3\cdot 5}{2\cdot 4\cdot 6^3}\frac{a^6}{x^6} + \ldots\right] \quad \left[\operatorname{Arch}\frac{x}{a}<0\right].$$

733.2. $$\int \frac{1}{x^2}\operatorname{Arch}\frac{x}{a}\,dx = -\frac{1}{x}\operatorname{Arch}\frac{x}{a} + \frac{1}{a}\operatorname{arcsec}\left|\frac{x}{a}\right| \quad \left[\operatorname{Arch}\frac{x}{a}>0,\ 0<\operatorname{arcsec}\left|\frac{x}{a}\right|<\frac{\pi}{2}\right],$$

$$= -\frac{1}{x}\operatorname{Arch}\frac{x}{a} - \frac{1}{a}\operatorname{arcsec}\left|\frac{x}{a}\right| \quad \left[\operatorname{Arch}\frac{x}{a}<0,\ 0<\operatorname{arcsec}\left|\frac{x}{a}\right|<\frac{\pi}{2}\right].$$

733.3. $$\int \frac{1}{x^3}\operatorname{Arch}\frac{x}{a}\,dx = -\frac{1}{2x^2}\operatorname{Arch}\frac{x}{a} + \frac{\sqrt{x^2-a^2}}{2a^2x}$$
$$\left[\operatorname{Arch}\frac{x}{a} > 0\right],$$
$$= -\frac{1}{2x^2}\operatorname{Arch}\frac{x}{a} - \frac{\sqrt{x^2-a^2}}{2a^2x}$$
$$\left[\operatorname{Arch}\frac{x}{a} < 0\right]. \quad [\text{См. } \mathbf{628.1—628.3.}]$$

733.9. $$\int \frac{1}{x^p}\operatorname{Arch}\frac{x}{a}\,dx =$$
$$= -\frac{1}{(p-1)\,x^{p-1}}\operatorname{Arch}\frac{x}{a} + \frac{1}{p-1}\int \frac{dx}{x^{p-1}\sqrt{x^2-a^2}}$$
$$\left[\operatorname{Arch}\frac{x}{a} > 0, \quad p \neq 1\right],$$
$$= -\frac{1}{(p-1)\,x^{p-1}}\operatorname{Arch}\frac{x}{a} - \frac{1}{p-1}\int \frac{dx}{x^{p-1}\sqrt{x^2-a^2}}$$
$$\left[\operatorname{Arch}\frac{x}{a} < 0, \quad p \neq 1\right]. \quad [\text{См. } \mathbf{281.01—284.01} \text{ и } \mathbf{628.9.}]$$

От 732 до 733.9 всюду $\frac{x}{a} > 1$.

734. $$\int \operatorname{Arth}\frac{x}{a}\,dx = x\operatorname{Arth}\frac{x}{a} + \frac{a}{2}\ln(a^2-x^2).$$

734.1. $$\int x\operatorname{Arth}\frac{x}{a}\,dx = \frac{x^2-a^2}{2}\operatorname{Arth}\frac{x}{a} + \frac{ax}{2}.$$

734.2. $$\int x^2\operatorname{Arth}\frac{x}{a}\,dx = \frac{x^3}{3}\operatorname{Arth}\frac{x}{a} + \frac{ax^2}{6} + \frac{a^3}{6}\ln(a^2-x^2).$$

734.3. $$\int x^3\operatorname{Arth}\frac{x}{a}\,dx = \frac{x^4-a^4}{4}\operatorname{Arth}\frac{x}{a} + \frac{ax^3}{12} + \frac{a^3x}{4}.$$

734.9. $$\int x^p\operatorname{Arth}\frac{x}{a}\,dx = \frac{x^{p+1}}{p+1}\operatorname{Arth}\frac{x}{a} - \frac{a}{p+1}\int \frac{x^{p+1}\,dx}{a^2-x^2}$$
$$[p \neq -1]. \quad [\text{См. } \mathbf{141.1—148.1.}]$$

735.1. $$\int \frac{1}{x}\operatorname{Arth}\frac{x}{a}\,dx = \frac{x}{a} + \frac{x^3}{3^2a^3} + \frac{x^5}{5^2a^5} + \frac{x^7}{7^2a^7} + \dots$$

735.2. $$\int \frac{1}{x^2}\operatorname{Arth}\frac{x}{a}\,dx = -\frac{1}{x}\operatorname{Arth}\frac{x}{a} - \frac{1}{2a}\ln\left(\frac{a^2-x^2}{x^2}\right).$$

735.3. $$\int \frac{1}{x^3}\operatorname{Arth}\frac{x}{a}\,dx = \frac{1}{2}\left(\frac{1}{a^2} - \frac{1}{x^2}\right)\operatorname{Arth}\frac{x}{a} - \frac{1}{2ax}.$$

735.4. $$\int \frac{1}{x^4}\operatorname{Arth}\frac{x}{a}\,dx =$$
$$= -\frac{1}{3x^3}\operatorname{Arth}\frac{x}{a} - \frac{1}{6ax^2} - \frac{1}{6a^3}\ln\left(\frac{a^2-x^2}{x^2}\right).$$

735.5. $$\int \frac{1}{x^5} \operatorname{Arth} \frac{x}{a}\, dx = \frac{1}{4}\left(\frac{1}{a^4} - \frac{1}{x^4}\right) \operatorname{Arth} \frac{x}{a} - \frac{1}{12ax^3} - \frac{1}{4a^3x}.$$

735.9. $$\int \frac{1}{x^p} \operatorname{Arth} \frac{x}{a}\, dx = -\frac{1}{(p-1)\,x^{p-1}} \operatorname{Arth} \frac{x}{a} + \frac{a}{p-1} \int \frac{dx}{x^{p-1}(a^2-x^2)} \qquad [p \neq 1].$$

[См. **151.1—155.1.**]

В 734—735.9 всюду $x^2 < a^2$.

736. $$\int \operatorname{Arcth} \frac{x}{a}\, dx = x \operatorname{Arcth} \frac{x}{a} + \frac{a}{2} \ln (x^2 - a^2).$$

736.1. $$\int x \operatorname{Arcth} \frac{x}{a}\, dx = \frac{x^2-a^2}{2} \operatorname{Arcth} \frac{x}{a} + \frac{ax}{2}.$$

736.2. $$\int x^2 \operatorname{Arcth} \frac{x}{a}\, dx = \frac{x^3}{3} \operatorname{Arcth} \frac{x}{a} + \frac{ax^2}{6} + \frac{a^3}{6} \ln (x^2 - a^2).$$

736.3. $$\int x^3 \operatorname{Arcth} \frac{x}{a}\, dx = \frac{x^4-a^4}{4} \operatorname{Arcth} \frac{x}{a} + \frac{ax^3}{12} + \frac{a^3x}{4}.$$

736.9. $$\int x^p \operatorname{Arcth} \frac{x}{a}\, dx = \frac{x^{p+1}}{p+1} \operatorname{Arcth} \frac{x}{a} - \frac{a}{p+1} \int \frac{x^{p+1}\, dx}{a^2-x^2} \qquad [p \neq -1].$$

[См. **141.1—148.1.**]

737.1. $$\int \frac{1}{x} \operatorname{Arcth} \frac{x}{a}\, dx = -\frac{a}{x} - \frac{a^3}{3^2x^3} - \frac{a^5}{5^2x^5} - \frac{a^7}{7^2x^7} - \ldots$$

737.2. $$\int \frac{1}{x^2} \operatorname{Arcth} \frac{x}{a}\, dx = -\frac{1}{x} \operatorname{Arcth} \frac{x}{a} - \frac{1}{2a} \ln \left(\frac{x^2-a^2}{x^2}\right).$$

737.3. $$\int \frac{1}{x^3} \operatorname{Arcth} \frac{x}{a}\, dx = \frac{1}{2}\left(\frac{1}{a^2} - \frac{1}{x^2}\right) \operatorname{Arcth} \frac{x}{a} - \frac{1}{2ax}.$$

737.4. $$\int \frac{1}{x^4} \operatorname{Arcth} \frac{x}{a}\, dx = -\frac{1}{3x^3} \operatorname{Arcth} \frac{x}{a} - \frac{1}{6ax^2} - \frac{1}{6a^3} \ln \left(\frac{x^2-a^2}{x^2}\right).$$

737.5. $$\int \frac{1}{x^5} \operatorname{Arcth} \frac{x}{a}\, dx = \frac{1}{4}\left(\frac{1}{a^4} - \frac{1}{x^4}\right) \operatorname{Arcth} \frac{x}{a} - \frac{1}{12ax^3} - \frac{1}{4a^3x}.$$

737.9. $$\int \frac{1}{x^p} \operatorname{Arcth} \frac{x}{a}\, dx = -\frac{1}{(p-1)\,x^{p-1}} \operatorname{Arcth} \frac{x}{a} + \frac{a}{p-1} \int \frac{dx}{x^{p-1}(a^2-x^2)} \qquad [p \neq 1].$$

[См. **151.1—155.1.**]

В 736—737.9 всюду $x^2 > a^2$.

738. $$\int \operatorname{Arsech}\frac{x}{a}\,dx = x\operatorname{Arsech}\frac{x}{a} + a\arcsin\frac{x}{a} \quad \left[\operatorname{Arsech}\frac{x}{a} > 0\right],$$
$$= x\operatorname{Arsech}\frac{x}{a} - a\arcsin\frac{x}{a} \quad \left[\operatorname{Arsech}\frac{x}{a} < 0\right].$$

738.1. $$\int x\operatorname{Arsech}\frac{x}{a}\,dx = \frac{x^2}{2}\operatorname{Arsech}\frac{x}{a} - \frac{a}{2}\sqrt{a^2-x^2} \quad \left[\operatorname{Arsech}\frac{x}{a} > 0\right],$$
$$= \frac{x^2}{2}\operatorname{Arsech}\frac{x}{a} + \frac{a}{2}\sqrt{a^2-x^2} \quad \left[\operatorname{Arsech}\frac{x}{a} < 0\right].$$

738.2. $$\int x^2\operatorname{Arsech}\frac{x}{a}\,dx = \frac{x^3}{3}\operatorname{Arsech}\frac{x}{a} - \frac{ax}{6}\sqrt{a^2-x^2} + \frac{a^3}{6}\arcsin\frac{x}{a} \quad \left[\operatorname{Arsech}\frac{x}{a} > 0\right],$$
$$= \frac{x^3}{3}\operatorname{Arsech}\frac{x}{a} + \frac{ax}{6}\sqrt{a^2-x^2} - \frac{a^3}{6}\arcsin\frac{x}{a} \quad \left[\operatorname{Arsech}\frac{x}{a} < 0\right].$$

738.9. $$\int x^p\operatorname{Arsech}\frac{x}{a}\,dx = \frac{x^{p+1}}{p+1}\operatorname{Arsech}\frac{x}{a} + \frac{a}{p+1}\int\frac{x^p\,dx}{\sqrt{a^2-x^2}} \quad \left[\operatorname{Arsech}\frac{x}{a} > 0 \quad p \neq -1\right],$$
$$= \frac{x^{p+1}}{p+1}\operatorname{Arsech}\frac{x}{a} - \frac{a}{p+1}\int\frac{x^p\,dx}{\sqrt{a^2-x^2}} \quad \left[\operatorname{Arsech}\frac{x}{a} < 0, \quad p \neq -1\right].$$

[См. **320.01—327.01.**]

739.1. $$\int \frac{1}{x}\operatorname{Arsech}\frac{x}{a}\,dx = -\frac{1}{2}\left(\ln\frac{a}{x}\right)\ln\frac{4a}{x} - \frac{1}{2^3}\frac{x^2}{a^2} - \frac{1\cdot3}{2\cdot4^3}\frac{x^4}{a^4} - \frac{1\cdot3\cdot5}{2\cdot4\cdot6^3}\frac{x^6}{a^6} - \ldots \quad \left[\operatorname{Arsech}\frac{x}{a} > 0\right],$$
$$= \frac{1}{2}\left(\ln\frac{a}{x}\right)\ln\frac{4a}{x} + \frac{1}{2^3}\frac{x^2}{a^2} + \frac{1\cdot3}{2\cdot4^3}\frac{x^4}{a^4} + \frac{1\cdot3\cdot5}{2\cdot4\cdot6^3}\frac{x^6}{a^6} + \ldots \quad \left[\operatorname{Arsech}\frac{x}{a} < 0\right].$$

739.2. $$\int \frac{1}{x^2}\operatorname{Arsech}\frac{x}{a}\,dx = -\frac{1}{x}\operatorname{Arsech}\frac{x}{a} + \frac{\sqrt{a^2-x^2}}{ax}$$
$$\left[\operatorname{Arsech}\frac{x}{a} > 0\right],$$
$$= -\frac{1}{x}\operatorname{Arsech}\frac{x}{a} - \frac{\sqrt{a^2-x^2}}{ax} \quad \left[\operatorname{Arsech}\frac{x}{a} < 0\right].$$

739.9. $$\int \frac{1}{x^p}\operatorname{Arsech}\frac{x}{a}\,dx =$$
$$= -\frac{1}{(p-1)\,x^{p-1}}\operatorname{Arsech}\frac{x}{a} - \frac{a}{p-1}\int \frac{dx}{x^p\sqrt{a^2-x^2}}$$
$$\left[\operatorname{Arsech}\frac{x}{a} > 0, \quad p \neq 1\right],$$
$$= -\frac{1}{(p-1)\,x^{p-1}}\operatorname{Arsech}\frac{x}{a} + \frac{a}{p-1}\int \frac{dx}{x^p\sqrt{a^2-x^2}}$$
$$\left[\operatorname{Arsech}\frac{x}{a} < 0, \quad p \neq 1\right]. \quad [\text{См. } \mathbf{342.01—346.01.}]$$

В **738—739.9** всюду $0 < x < a$.

740. $$\int \operatorname{Arcsch}\frac{x}{a}\,dx = x\operatorname{Arcsch}\frac{x}{a} + a\operatorname{Arsh}\frac{x}{a}.$$

740.1. $$\int x\operatorname{Arcsch}\frac{x}{a}\,dx = \frac{x^2}{2}\operatorname{Arcsch}\frac{x}{a} + \frac{a}{2}\sqrt{x^2+a^2}.$$

740.9. $$\int x^p\operatorname{Arcsch}\frac{x}{a}\,dx = \frac{x^{p+1}}{p+1}\operatorname{Arcsch}\frac{x}{a} + \frac{a}{p+1}\int \frac{x^p\,dx}{\sqrt{x^2+a^2}}$$
$$[p \neq -1]. \quad [\text{См. } \mathbf{200.01—207.01.}]$$

741.1. $$\int \frac{1}{x}\operatorname{Arcsch}\frac{x}{a}\,dx = -\frac{a}{x} + \frac{1}{2\cdot 3\cdot 3}\frac{a^3}{x^3} - \frac{1\cdot 3}{2\cdot 4\cdot 5\cdot 5}\frac{a^5}{x^5} +$$
$$+ \frac{1\cdot 3\cdot 5}{2\cdot 4\cdot 6\cdot 7\cdot 7}\frac{a^7}{x^7} - \ldots \qquad [x^2 > a^2],$$
$$= -\frac{1}{2}\left(\ln\frac{a}{x}\right)\ln\frac{4a}{x} + \frac{1}{2^2}\frac{x^2}{a^2} - \frac{1\cdot 3}{2\cdot 4^2}\frac{x^4}{a^4} + \frac{1\cdot 3\cdot 5}{2\cdot 4\cdot 6^2}\frac{x^6}{a^6} - \ldots$$
$$[0 < x < a],$$
$$= \frac{1}{2}\ln\left|\frac{a}{x}\right|\ln\left|\frac{4a}{x}\right| - \frac{1}{2^2}\frac{x^2}{a^2} + \frac{1\cdot 3}{2\cdot 4^2}\frac{x^4}{a^4} - \frac{1\cdot 3\cdot 5}{2\cdot 4\cdot 6^2}\frac{x^6}{a^6} + \ldots$$
$$[-a < x < 0].$$

741.9. $$\int \frac{1}{x^p}\operatorname{Arcsch}\frac{x}{a}\,dx =$$
$$= -\frac{1}{(p-1)x^{p-1}}\operatorname{Arcsch}\frac{x}{a} - \frac{a}{p-1}\int \frac{dx}{x^p\sqrt{x^2+a^2}}$$
$$[p \neq 1]. \quad [\text{См. } \mathbf{222.01—226.01.}]$$

В **740—741.9** всюду $a > 0$, $x > 0$ (кроме **741.1**).