Inverse Laplace Transforms: Expressions with Trigonometric Functions

No	*Laplace transform*, $\widetilde{f}(p)$	*Inverse transform*, $f(x)=\dfrac{1}{2\pi i}\displaystyle\int_{c-i\infty}^{c+i\infty} e^{px}\widetilde{f}(p)\,dp$
1	$\dfrac{\sin(a/p)}{\sqrt{p}}$	$\dfrac{1}{\sqrt{\pi x}}\sinh\left(\sqrt{2ax}\right)\sin\left(\sqrt{2ax}\right)$
2	$\dfrac{\sin(a/p)}{p\sqrt{p}}$	$\dfrac{1}{\sqrt{\pi a}}\cosh\left(\sqrt{2ax}\right)\sin\left(\sqrt{2ax}\right)$
3	$\dfrac{\cos(a/p)}{\sqrt{p}}$	$\dfrac{1}{\sqrt{\pi x}}\cosh\left(\sqrt{2ax}\right)\cos\left(\sqrt{2ax}\right)$
4	$\dfrac{\cos(a/p)}{p\sqrt{p}}$	$\dfrac{1}{\sqrt{\pi a}}\sinh\left(\sqrt{2ax}\right)\cos\left(\sqrt{2ax}\right)$
5	$\dfrac{1}{\sqrt{p}}\exp\left(-\sqrt{ap}\right)\sin\left(\sqrt{ap}\right)$	$\dfrac{1}{\sqrt{\pi x}}\sin\left(\dfrac{a}{2x}\right)$
6	$\dfrac{1}{\sqrt{p}}\exp\left(-\sqrt{ap}\right)\cos\left(\sqrt{ap}\right)$	$\dfrac{1}{\sqrt{\pi x}}\cos\left(\dfrac{a}{2x}\right)$

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No	*Laplace transform*, $\widetilde{f}(p)$	*Inverse transform*, $f(x)=\dfrac{1}{2\pi i}\displaystyle\int_{c-i\infty}^{c+i\infty} e^{px}\widetilde{f}(p)\,dp$
1	$\arctan\dfrac{a}{p}$	$\dfrac{1}{x}\sin(ax)$
2	$\dfrac{1}{p}\arctan\dfrac{a}{p}$	$\mathrm{Si}(ax)$, where $\mathrm{Si}(x)$ is the integral sine
3	$p\arctan\dfrac{a}{p}-a$	$\dfrac{1}{x^2}\left[ax\cos(ax)-\sin(ax)\right]$
4	$\arctan\dfrac{2ap}{p^2+b^2}$	$\dfrac{2}{x}\sin(ax)\cos\left(x\sqrt{a^2+b^2}\right)$

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