$\mathcal{L}\{1\}=\frac{1}{s}$ $\qquad$ $\mathcal{L}\{t^n\}=\frac{n!}{s^{n+1}}$ $\qquad$ $\mathcal{L}\{e^{at}\}=\frac{1}{s-a}$

$\mathcal{L}\{t^n e^{at}\}=\frac{n!}{(s-a)^{n+1}}$ $\qquad$ $\mathcal{L}\{\sin(bt)\}=\frac{b}{s^2+b^2}$ $\qquad$ $\mathcal{L}\{\cos(bt)\}=\frac{s}{s^2+b^2}$

$\mathcal{L}\{\sinh(bt)\}=\frac{b}{s^2-b^2}$ $\qquad$ $\mathcal{L}\{t\sin(bt)\}=\frac{2bs}{(s^2+b^2)^2}$ $\qquad$ $\mathcal{L}\{e^{at}\sin(bt)\}=\frac{b}{(s-a)^2+b^2}$

$\mathcal{L}\{\cosh(bt)\}=\frac{s}{s^2-b^2}$ $\qquad$ $\mathcal{L}\{t\cos(bt)\}=\frac{s^2-a^2}{(s^2+b^2)^2}$ $\qquad$ $\mathcal{L}\{e^{at}\cos(bt)\}=\frac{s-a}{(s-a)^2+b^2}$

Laplace Transforms For You!

$$\mathcal{L}\{f(t)\}=\int_0^\infty e^{-st}f(t)\,dt=F(s)$$

$\mathcal{L}\{\ln t\}=\frac{-\gamma-\ln s}{s}$ $\qquad$ $\mathcal{L}\{t^r\}=\frac{\Gamma(r+1)}{s^{r+1}},\ r>-1$ $\qquad$ $\mathcal{L}\{t^{n-\frac{1}{2}}\}=\frac{1\cdot 3\cdot 5\cdots(2n-1)\sqrt{\pi}}{2^n s^{n+\frac{1}{2}}}$

$\mathcal{L}\left\{\frac{e^{at}-e^{bt}}{t}\right\}=\ln\left(\frac{s-b}{s-a}\right)$ $\qquad$ $\mathcal{L}\left\{\frac{\sin(bt)}{t}\right\}=\frac{\pi}{2}-\tan^{-1}\left(\frac{s}{b}\right)$ $\qquad$ $\mathcal{L}\left\{\frac{1-\cos(bt)}{t}\right\}=\frac{1}{2}\ln\left(1+\frac{b^2}{s^2}\right)$

$\mathcal{L}\{\mathcal{U}(t-a)\}=\frac{e^{-as}}{s}$ $\qquad$ $\mathcal{L}\{\Pi_{a,b}(t)\}=\frac{e^{-as}-e^{-bs}}{s}$ $\qquad$ $\mathcal{L}\{\delta(t-a)\}=e^{-as}$

$\mathcal{L}\{af(t)\}=aF(s)$ $\qquad$ $\mathcal{L}\{f(at)\}=\frac{1}{a}F\left(\frac{s}{a}\right)$ $\qquad$ $\mathcal{L}\{e^{at}f(t)\}=F(s-a)$

$\mathcal{L}\{tf(t)\}=-\frac{d}{ds}(F(s))$ $\qquad$ $\mathcal{L}\left\{\frac{f(t)}{t}\right\}=\int_s^\infty F(u)\,du$ $\qquad$ $\mathcal{L}\{t^n f(t)\}=(-1)^n\frac{d^n}{ds^n}(F(s))$

$\mathcal{L}\{f(t-a)\mathcal{U}(t-a)\}=e^{-as}\mathcal{L}\{f(t)\}$ $\qquad$ $\mathcal{L}\{f(t)\mathcal{U}(t-a)\}=e^{-as}\mathcal{L}\{f(t+a)\}$

$\mathcal{L}\{f(t)*g(t)\}=F(s)G(s)$ $\qquad$ $\mathcal{L}\left\{\int_0^t f(v)\,dv\right\}=\frac{F(s)}{s}$

$\mathcal{L}\{f'(t)\}=sF(s)-f(0)$ $\qquad$ $\mathcal{L}\{f''(t)\}=s^2F(s)-sf(0)-f'(0)$

$$\mathcal{L}\{f^{(n)}(t)\}=s^nF(s)-s^{n-1}f(0)-s^{n-2}f'(0)-s^{n-3}f''(0)-\cdots-sf^{(n-2)}(0)-f^{(n-1)}(0)$$

You're Welcome!

bprp

$\Gamma(x)=\int_0^\infty t^{x-1}e^{-t}\,dt$ $\qquad$ $\delta(t-a)=\begin{cases}\infty & \text{if } t=a\\ 0 & \text{otherwise}\end{cases}$ $\qquad$ $\mathcal{U}(t-a)=\begin{cases}1 & \text{if } t>a\\ 0 & \text{if } t<a\end{cases}$

$\Gamma(n)=(n-1)!$ $\qquad$ $\int_{-\infty}^\infty f(t)\delta(t-a)\,dt=f(a)$ $\qquad$ $\Pi_{a,b}(t)=\begin{cases}1 & \text{if } a<t<b\\ 0 & \text{otherwise}\end{cases}$

$(\frac{1}{2})!=\frac{\sqrt{\pi}}{2}$ $\qquad$ $\int_{-\infty}^\infty e^{-x^2}\,dx=\sqrt{\pi}$ $\qquad$ $\Pi_{a,b}(t)=\mathcal{U}(t-a)-\mathcal{U}(t-b)$

$\gamma=\lim_{n\to\infty}\left(-\ln n+\sum_{k=1}^n\frac{1}{k}\right)$ $\qquad$ $\int_{-\infty}^\infty\frac{\sin x}{x}\,dx=\pi$ $\qquad$ $f(t)*g(t)=\int_0^t f(t-v)g(v)\,dv$