Answer on Question #54517 – Math – Differential Equations

pls solve inerse laplace problem :

L^-1{ a/(s+b)*exp(-y *sqrt(s+c))} .

Solution

$$f(t) = L^{-1}\left\{\frac{a}{s+b}e^{-y\sqrt{s+c}}\right\}$$

$$L^{-1}\left\{\frac{a}{s}e^{-y\sqrt{s+c}}\right\} = \frac{a}{2}e^{-y\sqrt{c}}erfc\left(\frac{y-2\sqrt{c}t}{2\sqrt{t}}\right) + \frac{a}{2}e^{y\sqrt{c}}erfc\left(\frac{y+2\sqrt{c}t}{2\sqrt{t}}\right),\ y > 0.$$

If $f(t) = L^{-1}\{F(s)\}$, **then** $f(t) = e^{at}L^{-1}\{F(s+a)\}$.

Thus $f(t) = e^{bt}L^{-1}\left\{\frac{a}{s}e^{-y\sqrt{s+c-b}}\right\} =$

$$= \frac{a}{2}e^{bt}\left[e^{-y\sqrt{c-b}}erfc\left(\frac{y-2\sqrt{c-bt}}{2\sqrt{t}}\right) + e^{y\sqrt{c-b}}erfc\left(\frac{y+2\sqrt{c-bt}}{2\sqrt{t}}\right)\right]$$