

Problem Set 3 Differential Equations Due 3/13/06

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$$\blacktriangleright \mathcal{L}(y(t)) = \int_0^{\infty} y(t)e^{-st} dt$$

$\frac{1}{4}$. Let $y(t) = 1$. Find $\mathcal{L}(y(t))$.

$\frac{1}{2}$. Let $y(t) = e^{3t}$. Find $\mathcal{L}(y(t))$ for $s > 3$. Why does the restriction matter?

1. Let $y(t) = e^{at}$. Find $\mathcal{L}(y(t))$ for $s > a$. Why does the restriction matter?

$\frac{3}{2}$. Let $y(t) = 1$. Find $\mathcal{L}(y(t))$ again, this time cleverly using your result from problem 1.

2. Show that $\mathcal{L}\left(\frac{dy}{dt}\right) = s \cdot \mathcal{L}(y) - y(0)$.

3. Find $\mathcal{L}(\cos \omega t)$.

4. Find $\mathcal{L}(\sin \omega t)$.

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