Homework 23. *Chapter 15.*

3.1 $L(y') = pY - y(0)$. Substituting y' for y in this gives $L(y'') = pL(y') - y'(0) = p(pY - y(0)) - y'(0) = p^2Y - py(0) - y'(0)$. Substituting y' for y in this gives $L(y''') = pL(y'') - y''(0) = p(p^2Y - py(0) - y'(0)) - y''(0) = p^3Y - p^2y(0) - py'(0) - y''(0)$.

3.2 $(3 + 2t)e^t$. (Laplace transform is $3/(p-1) + 2/(p-1)^2$.)

3.3 $e^{-2t}(4t + t^2/2)$

3.4 $\cos(t) + \sin(t)/2 - t\cos(t)/2$

3.6 $(t^3/6 + 5t)e^{3t}$.

3.13 $\sinh(2t)$

3.25 $(3 + t)e^{-2t}\sin(t)$

3.27 $y = t + (1 - e^{4t})/4$, $z = 1/3 + e^{4t}$

3.28 $y = t\cos(t) - 1$, $z = \cos(t) + t\sin(t)$.