

## Lecture 3 Homework

- 1) Find the product of  $z_1 = 4 - 2i$  and  $z_2 = 4 + 2i$ .
- 2) Express the number  $z = 4i$  in polar form.
- 3) Show that  $f(z) = e^{\bar{z}}$  (the exponent is the conjugate of  $z$ ) is nowhere analytic.
- 4) Show using the definition of the inverse Fourier transform that  $1$  is the inverse transform of  $2\pi\delta(x)$ .
- 5) Find the Fourier transform of  $\text{sgn}(x)$  using the definition (i.e. by integration).
- 6) Find the Laplace transform of  $\cos^2(t)$ . Hint: First use a half-angle formula, then apply given rules.
- 7) Find the inverse Laplace transform of  $\frac{4}{(s+1)(s+2)}$ . Hint: First write this as a product of transforms.
- 8) Find the inverse Laplace transform of  $\frac{1}{(s+1)^2}$ . Hint: First write this as a derivative of another transform.