

Useful identities:

$$\cos \theta = \frac{e^{i\theta} + e^{-i\theta}}{2}$$

$$\sin \theta = \frac{e^{i\theta} - e^{-i\theta}}{2i}$$

$$\cos^2 \theta = \frac{1}{2} (1 + \cos 2\theta)$$

$$\sin^2 \theta = \frac{1}{2} (1 - \cos 2\theta)$$

$$f_k = \frac{1}{\sqrt{L}} \int_a^{a+L} e^{-\frac{2\pi i k x}{L}} f(x) dx$$

$$f(x) = \frac{1}{\sqrt{L}} \sum_{k=-\infty}^{\infty} f_k e^{\frac{2\pi i k x}{L}}$$

$$\tilde{f}(\xi) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} e^{-i\xi x} f(x) dx$$

$$f(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} e^{i\xi x} \tilde{f}(\xi) d\xi$$

$$\delta(x) = \frac{1}{2\pi} \int_{-\infty}^{\infty} e^{i\xi x} d\xi$$

$$(f * g)(x) = \int_{-\infty}^{\infty} f(y) g(x - y) dy$$

$$f(v) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(v-\mu)^2}{2\sigma^2}}$$

$$P(A \cap B) = P(A)P(B|A)$$

$$P(A) = P(B)P(A|B) + P(\overline{B})P(A|\overline{B})$$