(5)

$$\mathcal{F}^{-1}\left\{\frac{e^{5i(k+1)}}{k^2+2k+6}\right\} = \mathcal{F}^{-1}\left\{\frac{e^{5i(k+1)}}{(k+1-i\sqrt{5})(k+1+i\sqrt{5})}\right\} = \cdots$$

$k_0 = -1$

$$\frac{\Delta}{4} = 1 - 6 = -5$$

$$k_{1,2} = -1 \pm i\sqrt{5}$$

$$e^{-i(-5)k}$$

$$"$$

$$\mathcal{F}^{-1}\left\{\frac{e^{5ik}}{(k-i\sqrt{5})(k+i\sqrt{5})}\right\} = \mathcal{F}^{-1}\left\{\frac{e^{5ik}}{k^2-i^2 5}\right\} = \mathcal{F}^{-1}\left\{\frac{e^{5ik}}{k^2+5}\right\}$$

$$= \frac{1}{2\sqrt{5}} e^{-\sqrt{5}|x+5|}$$

$$\mathcal{F}^{-1}\left\{\underbrace{\frac{1}{k^2+5}}_{F(k)}\right\} = \frac{1}{2\sqrt{5}}\mathcal{F}^{-1}\left\{\frac{2\sqrt{5}}{5+k^2}\right\} = \underbrace{\boxed{\frac{1}{2\sqrt{5}} e^{-\sqrt{5}|x|}}}_{f(x)}$$

$$\mathcal{F}\left\{f(x-x_0)\right\} = e^{-ix_0 k} F(k)$$

$$f(x-x_0) = \mathcal{F}^{-1}\left\{e^{-ix_0 k}\underline{F(k)}\right\}$$

$$\cdots = \frac{\sqrt{5}}{\sqrt{5}}\frac{1}{2\sqrt{5}} e^{-\sqrt{5}|x+5|} e^{-ix} = \frac{\sqrt{5}}{2\cdot 5} e^{-\sqrt{5}|x+5|-ix} = \frac{\sqrt{5}}{10} e^{-\sqrt{5}|x+5|-ix}$$

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$$\mathcal{F}^{-1}\left\{\underbrace{\frac{\sin 3(k-1)}{e^{ik}(k-1)}}_{F(k-k_0)}\right\} \quad k_0=1$$

$$= \mathcal{F}^{-1}\left\{\frac{\sin 3(k-1)}{e^{i(k-1)}\cdot e^{i}(k-1)}\right\} = \underbrace{\frac{1}{2}\left[H(x+2)-H(x-4)\right]e^{i(x-1)}}_{f(x)e^{ik_0x}}$$

PROP 3

$$\frac{1}{e^{i}}\mathcal{F}^{-1}\left\{\frac{\sin 3k}{e^{ik}k}\right\} = e^{-i}\mathcal{F}^{-1}\left\{e^{-ik}\frac{\sin 3k}{k}\right\} = f(x-1) \qquad \underbrace{\frac{e^{-i}}{2}\left[H(x+2)-H(x-4)\right]}_{f(x)}$$

PROP 2

$$\frac{e^{-i}}{2}\mathcal{F}^{-1}\left\{2\,3\,\frac{\sin 3k}{3k}\right\} = \underbrace{\frac{e^{-i}}{2}\left[H(x+3)-H(x-3)\right]}_{f(x)}$$