

1. $f(t) = 2e^{-6t}u(t) + \cos(2t)u(t)$

Find $F(s)$

$$F(s) = 2\left(\frac{1}{s+6}\right) + \frac{s}{s^2+4}$$

2. $f(t) = t^2 u(t)$ "power of t " pair for $n=3$: $\frac{t^2}{2!} = \frac{t^2}{2} \Leftrightarrow \frac{1}{s^3}$ so mult by 2

Find $F(s)$

$$\boxed{\frac{2}{s^3}}$$

3. $f(t) = (t-5)u(t-5)$ $t u(t) \Leftrightarrow \frac{1}{s^2}$
Find $F(s)$ so $(t-5)u(t-5) \Leftrightarrow \boxed{\frac{1}{s^2} e^{-5s}}$

4. $f(t) = tu(t-5)$ for time-shift property, all t 's must look like $(t-5)$, so

Find $F(s)$

$$f(t) = (t-5)u(t-5) + 5u(t-5)$$

$$F(s) = \frac{1}{s^2} e^{-5s} + \frac{5}{s} e^{-5s}$$

$$= \boxed{\left(\frac{1}{s^2} + \frac{5}{s}\right) e^{-5s}}$$

5. $F(s) = 7$

Find $f(t)$

$$7\delta(t)$$

6. $F(s) = \frac{4+s}{s^2+16}$

Find $f(t)$ (hint: check out sin, cos)

$$F(s) = \frac{4}{s^2+16} + \frac{s}{s^2+16}$$

$$f(t) = [\sin(4t) + \cos(4t)] u(t)$$

$$= \boxed{\sqrt{2} \cos(4t - 45^\circ) u(t)}$$

