

Suggested problems 23

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1. Suppose $f(t) = \sin t + u_1(t) - 5u_4(t) - 2u_5(t) \cos t + \pi u_9(t)$. Find $f(0)$, $f(\pi)$, $f(2\pi)$, $f(8)$ and $f(4\pi)$.
2. Find the Laplace transform of $f(t) = u_3(t)t^2e^{-t}$.
3. Rewrite the following piecewise function $f(t)$ in terms of the unit-step function. Then find its Laplace transform.

$$f(t) = \begin{cases} 6e^{\pi t}, & t < 3, \\ -3t, & 3 \leq t < 4, \\ 2t^2, & t \geq 4 \end{cases}$$

4. Find the inverse Laplace transformation of each function given below

(a) $F(s) = e^{-2s} \frac{2s-14}{s^2+2s+17}$,

(b) $F(s) = e^{-10s} \frac{3s^2}{(s-1)(s+2)^2}$.