**Homework 4: Laplace Transform**

**Prob 4.1:** Find the Laplace transform of the following functions:

- a) $2e^{4t}$
- b) $2t^2 - e^{-t}$
- c) $6 \sin 2t - 5 \cos 2t$
- d) $(\sin t - \cos t)^2$

**Prob 4.2:** Find the Laplace transform of the following functions:

- a) $t^3 e^{-3t}$
- b) $2e^t \sin(4t)$
- c) $e^{-4t} \cosh(2t)$
- d) $5 \cos(t) \delta(t - 2)$
Homework 4: Laplace Transform

**Prob 4.3:** Find the Laplace transform of the following functions:

a) \( f(t) = -20e^{-5(t-2)}u(t-2) \)

b) \( f(t) = (8t-8)[u(t-1) - u(t-2)] + (24-8t)[u(t-2) - u(t-4)] + (8t-40)[u(t-4) - u(t-5)] \)

**Prob 4.4:** Find the Laplace transform of the following functions:

a) \( f(t) = \begin{cases} 0 & (0 < t < 2) \\ 4 & (t > 2) \end{cases} \)

b) \( f(t) = \begin{cases} 2t & (0 < t < 5) \\ 1 & (t > 5) \end{cases} \)
Homework 4: Laplace Transform

Prob 4.5: Given a function:

a) Express the function in unit step form?
b) Determine its Laplace transform?

Prob 4.6: Find the Laplace Transform of a periodic signal?