1. Use the following trig identities:

   - $\sin^2(\theta) + \cos^2(\theta) = 1$
   - $\sin(\theta)\cos(\gamma) = \frac{1}{2}[\sin(\theta + \gamma) + \sin(\theta - \gamma)]$
   - $\cos^2(\theta) = \frac{1}{2}[1 + \cos(2\theta)]$

   to take the Laplace transform of

   $$f(t) = \sin^3(t)$$

2. Take the inverse Laplace transform of the following functions :

   - $\dfrac{4s^2 + 5s - 3}{(s-1)(s+2)(s+1)}$
   - $\dfrac{s^2 - s + 4}{(s^2 - 2s + 2)(s+2)}$
   - $\dfrac{3s^2 - s}{(s-1)^2(s+1)}$