Problem A

Find the inverse Laplace transform of the following transforms.

1) $\dfrac{3}{s^2+4}$.

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

3) $\dfrac{2}{s^2+3s+5}$.

4) $\dfrac{3s}{s^2-s-6}$.

5) $\dfrac{2s+2}{s^2+2s+5}$.

6) $\dfrac{2s-3}{s^2-4}$.

7) $\dfrac{2s+1}{s^2-2s+2}$.

8) $\dfrac{8s^2-4s+12}{s(s^2+4)}$.

9) $\dfrac{2s^2+4s+6}{(s+1)^2(s-1)}$.

10) $\dfrac{s+1}{s(s-1)^2}$.

Problem B

Find the solutions to the following initial value problems.

1) $y''-y'-6y=0$, with $y(0)=1$, $y'(0)=-1$.

2) $y''+3y'+2y=0$, with $y(0)=1$, $y'(0)=0$.

3) $y''+2y'+5y=0$, with $y(0)=2$, $y'(0)=1$.

4) $y''+\omega^2 y=\cos 2t$, with $\omega^2\neq 4$, $y(0)=1$, $y'(0)=0$.

5) $y''+2y'+y=4e^{-t}$, with $y(0)=2$, $y'(0)=-1$.