MATH 217 – WORKSHEET 08

Q.1 Use the table of Laplace transforms on p.208 to evaluate the following without integration:

(a) $L[\sinh ax](p) = \dfrac{a}{p^2 - a^2}$.

(b) $L[\cosh ax](p) = \dfrac{p}{p^2 - a^2}$.

(c) Use the double angle formula $\cos 2z = \cos^2 z - \sin^2 z$ to find $L[\cos^2 ax](p)$ and $L[\sin^2 ax](p)$ without integration.

Q.2 Find each function $f(x)$ whose Laplace transform $L[f](p)$ is given.

(a) $30/p^4$

(b) $1/(p^2 + p)$

(c) $1/(p^4 + p^2)$

(d) $2/(p + 3)$

Q.3 Find the Laplace transform $L[f](p)$ for each of the functions $f(x)$ given.

(a) 17

(b) $x^2 + \cos 5x$

(c) $3e^{2x} - 4 \sin x \cos x$

(d) $x^5 \cos^2 5x + x^5 \sin^2 5x$

Q.4 Find the Laplace transforms of the following functions:

(a) $x^5 e^{5x}$

(b) $(1 - x^2)e^{-x}$

(c) $x \sin 3x$

Q.5 Find the function $f(x)$ given the Laplace transform $L[f](p)$ below:

(a) $\dfrac{6}{(p + 2)^2 + 9}$

(b) $\dfrac{p}{4p^2 + 1}$

(c) $\dfrac{p + 3}{p^2 + 2p + 5}$

(d) $\dfrac{1}{p^4 + 3p^2 + 2}$