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TMA4130  
Matematikk 4N  
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**Exercise set 6**

In all problems you are supposed to show the details of your work and describe what you are doing.

1 Compute the Laplace transform of the following functions:

a)  $f(t) = 2t + 8$ ,

b)  $f(t) = e^t \cos(\pi t)$ ,

c)  $f(t) = \sinh(t) \cos(t)$ .

2 Find the function  $f$  for which the Laplace transforms have the following form:

a)  $F(s) = \frac{2}{s^3} + \frac{3}{s}$ ,

b)  $F(s) = \frac{2}{(s-3)^4} + \frac{2s}{s^2+100}$ ,

c)  $F(s) = \frac{11-s}{s^2-2s-3}$ .

3 Use the Laplace transform in order to find the solutions of the following initial value problems:

a)  $y'' + y' - 6y = 0$ ,  $y(0) = 1$ ,  $y'(0) = 1$ ,

b)  $y' - 6y = 0$ ,  $y(-1) = 4$ .

c)  $y' + \frac{2}{3}y = -4 \cos(2t)$ ,  $y(0) = 0$ .