Laplace Transforms with shifts in the s domain

1. Find the Laplace Transform of $e^{2t}t^3$.
2. Find the Inverse Laplace Transform of
$$\frac{s+5}{s^2+4s+29}$$
Hint: start be "completing the square" in the denominator.

Laplace Transform of Piecewise Continuous Functions

1. Find the Laplace Transform of
$$f(t) = \begin{cases} t & 0 \leq t \leq 1 \\ 2-t & 1 \leq y \leq 2 \\ 0 & t > 2 \end{cases}$$
2. Find the Laplace Transform of
$$f(t) = \begin{cases} 0 & 0 \leq t < 2 \\ \sin(\pi t) & 2 \leq t < 3 \\ 0 & t \geq 3 \end{cases}$$