

4. [8 points] Use the fact that $\int_0^\infty e^{-x} \sin(x) dx = \frac{1}{2}$ to find $\int_0^\infty e^{-x} \cos(x) dx$.
5. [8 points] Let $F(x) = \int_0^{x^2(x-1)} g(t) dt$, where $g(t)$ is always positive. For what values of x is $F(x)$ increasing? For what values is it decreasing?