MAT 131 sample problems for Final exam

1.Find the local and global extreme values of function on the given interval.
1)
$$f(x) = x + \sin 2x, x \in [0, \pi]$$

2
$$f(x) = x^3 - 3x^2 + 3x + 1, x \in [0, 2]$$

3)
$$f(x) = x^2 \ln x, x \in [\frac{1}{e}, e]$$

4)
$$f(x) = 2\cos x + \sin 2x, x \in [0, 2\pi]$$

2.Related rates. **section 4.1**20, 22, 35,
3.Optimization problems **section 4.6** 18, 20, 50, 52,54
4. Evaluate the integral:
1)
$$\int_0^4 |x^2 - 4x + 3| dx$$

2)
$$\int_0^\pi (\sin x - x) dx$$

5.Differentiate the given function:
1)
$$\int_{x^2}^{cosx} \arccos t dt$$

2)
$$\int_{\sin x}^{\tan x} e^{-t^2} dt$$