Math Camp 2020 Summer
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Homework 4

Illustrate the definitions of the following notations (i) (X, d); (ii) $B(a;\delta), B'(a;\delta)$; (iii) $\bar{E}$; (iv) E° .
Show partial theorem 2.3 mentioned in class (iii) The union of any collection of open subsets of X is open. (iv) The intersection of a finite number of open subsets of X is open.
Show that the intersection of any collection of closed subsets of X is closed.
Find the antiderivative $\int \frac{dx}{\sqrt{1+4x}}$
Find the antiderivative $\int \frac{xdx}{\sqrt{1+x^2}}$
Find the antiderivative $\int 2^x e^x dx$
Find the antiderivative $\int xe^{-x^2} dx$
Find the antiderivative $\int \frac{lnx}{x^2} dx$
Find the antiderivative $\int x^2 e^x dx$
Find the derivative of the function $g(x) = \int_0^{x^2} \sqrt{1+t^2} dt$
Find the derivative of the function $g(x) = \int_{\sqrt{x}}^{x} (t^2 - t) dt \ \ at\ x = 1.$
Evaluate the integral $\int_0^2 (x^3 - x^2) dx$

Find the area bounded by $y = 2x - x^2$ and $x + y = 0$
Compute the integral $\int_{-2}^{2} \frac{dx}{x^3}$. Hint: consider improper integral.