

YOUR NAME: _____

George Voutsadakis

Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Compute the following integrals:

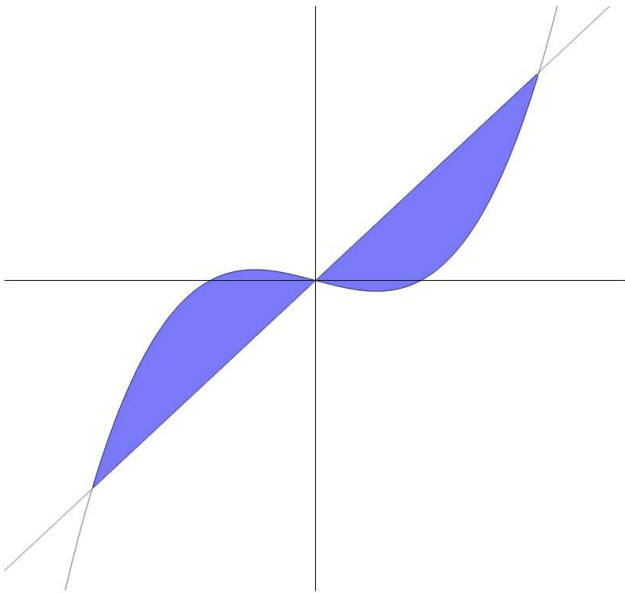
(a) $\int (4x^7 - 5x^4 + 6x^2 + 7)dx =$

(b) $\int \frac{x^7 + x^3 - x^2 + 5}{x^3} dx =$

(c) $\int \left(10\sqrt[3]{x^2} - \frac{4}{\sqrt[5]{x^3}} \right) dx =$

2. According to a certain study on climate change, the temperature of the earth is rising, due to the “greenhouse effect”, at the rate of $0.014e^{t/100}$ degrees Fahrenheit per year. Find the cumulative change of temperature due to “greenhouse effect” in the next 100 years.

3. Find the area of the region bounded by the graphs of the functions $f(x) = x^3 - 2x$ and $g(x) = 7x$. Please, show all your steps clearly.



4. Consider the function $f(x) = \frac{x^3 + 2}{\sqrt{x^4 + 8x}}$.

(a) Compute the indefinite integral $\int f(x)dx$. Please, show all details clearly.

(b) Find the average value of $f(x)$ on the interval $[1, 3]$.

(Hint: Use the indefinite integral of Part (a) to do this more quickly.)

5. Compute the following integrals:

(a) $\int x e^{-5x} dx$

(b) $\int \sqrt[3]{x} \ln x dx$