Assignment # 3

Q1: The velocity constant k of a given chemical reaction is given by:

$$\boldsymbol{kt = \int \left(\frac{1}{(3 - 0.4x)(2 - 0.6x)} \right) dx}$$

where **x= 0 when t = 0.** Show that: $\boldsymbol{kt = \ln\{\frac{2(3-0.4x)}{3(2-0.6x)}\}}$

Q2: Find $\boldsymbol{\frac{\int(3+6x+4x^2-2x^3)}{x^2(x^2+3)} dx}$

Q3: Determine $\int \frac{dx}{7-3sinx+6cosx}$

Q4: Determine if the following integral is convergent or divergent. If it is convergent find its value.

$$\int_{-\infty}^{\infty} xe^{-x^2} dx$$

Q5: Determine if the following integral converges or diverges. If the integral converges determine its value.

$$\int_{0}^{4} \frac{x}{x^2 - 9} dx$$

Q6: Determine the area of the region bounded by

$y = x^2 + 2$, $y = sinx$, $x = -1$ *and* $x = 2$.

Q7: Determine the area of the region bounded by

$x = e^{1+2y}$, $x = e^{1-y}$, $y = -2$ *and* $y = 1$.

Q8: Sketch the region enclosed by the curves and find its area.

$y = 2 + |x - 1|$ **and** $y = -\frac{1}{5}x + 7$.

Q9: Use the method of disks/rings to determine the volume of the solid obtained by rotating the region bounded by $y = 2x^2$ *and* $y = x^3$ about the x-axis.

Q10: Determine the volume of the solid obtained by rotating the portion of the region bounded by $y = \sqrt[3]{x}$, $y = \frac{x}{4}$ quadrant about the y-axis.