EXAM 2 - MATH 152 Friday, March 3

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. Calculate the integral $\int \frac{1}{\sqrt{9-x^2}} dx$.

2. Calculate the integral

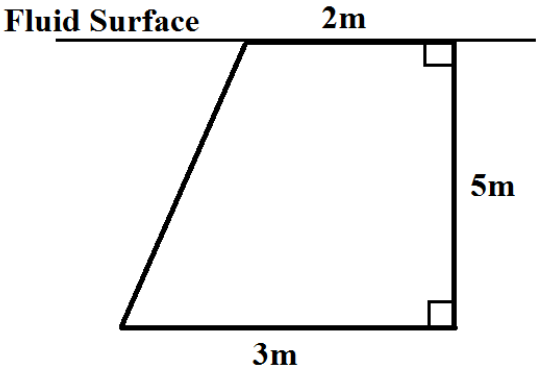
$$\int \frac{4x^2 - 21x + 1}{(x-7)(x^2+1)} dx.$$

3. Consider the function $f(x) = \dfrac{1}{\sqrt[3]{1-x}}$. Note that it is undefined at $x = 1$.

   (a) Compute $\displaystyle\int_0^R f(x)dx$, for $0 < R < 1$.

   (b) Use Part (a) to find $\displaystyle\int_0^1 f(x)dx$.

4. The figure shows a plate submerged into a fluid of density ρ. Find the force applied on one side of the plate by the fluid. (You may leave ρ and g as constants in the final answer.)



5. Consider the quarter of an ellipse centered at the origin, whose equation is given by

$$4x^2 + 25y^2 = 100.$$

Suppose it is made out of material whose density is ρ. Calculate its x- and y-moments.