Math 156   Applied Honors Calculus II   Fall 2009

hw3 , due: Tuesday, September 29

section 6.4 (work) page 401 / 2 , 8 , 12 , 13 , 21 , 27 , 28

note: in problem 21, use the fact that the density of water is $\rho = 1000\,\text{kg/m}^3$

section 8.8 (improper integrals) page 573 / 2a,b , 3

note: in problem 3, express the answer as a decimal (e.g. 0.495 instead of 99/200)

1. True or False? Justify your answer.

a) If $\displaystyle\int_a^b f(x)\,dx \le \int_a^b g(x)\,dx$, then $f(x) \le g(x)$ for all x in the interval $[a, b]$.

b) $f(b) = f(a) + \displaystyle\int_a^b f'(x)\,dx$

c) $\displaystyle\int_a^b f(x)f'(x)\,dx = \frac{f(b)^2 - f(a)^2}{2}$

d) $\displaystyle\int_1^\infty \frac{dx}{x}$ is a proper integral because $\dfrac{1}{x}$ is a bounded function for $1 \le x < \infty$.

e) The area under the graph of $\dfrac{1}{\sqrt{x}}$ from $x = 0$ to $x = 1$ is finite.

f) $\displaystyle\int_{-1}^1 \frac{dx}{x^4} = -\frac{2}{3}$

2. The <u>error function</u>, $\mathrm{erf}(x) = \frac{2}{\sqrt{\pi}} \int_0^x e^{-t^2}\,dt$, is used in probability and physics. Find the following quantities. To estimate the value in (c), use the midpoint rule with $n = 2$.

a) $\mathrm{erf}(0)$ b) $\mathrm{erf}'(0)$ c) $\mathrm{erf}(1)$ d) $\mathrm{erf}'(1)$

<u>Announcement</u>
On Friday Sept 25 the class will meet in a computer lab in the basement of East Hall instead of the usual classroom in Dennison. Section 1 (10-11am) will meet in room B737 and all other sections will meet in room B735 at the regularly scheduled class time. The objective is to learn about the Maple software package for solving calculus problems.