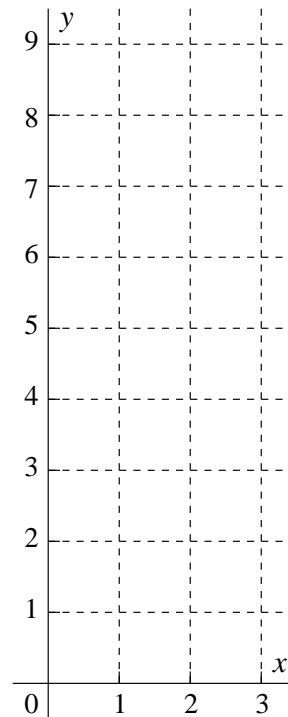


- (16) 1. A region R in the first quadrant of the plane is bounded by the y -axis, $y = \frac{1}{3}x^2$, and $y = 9 - 2x$.

a) Sketch R on the coordinate axes displayed to the right. Be sure to label the region R .

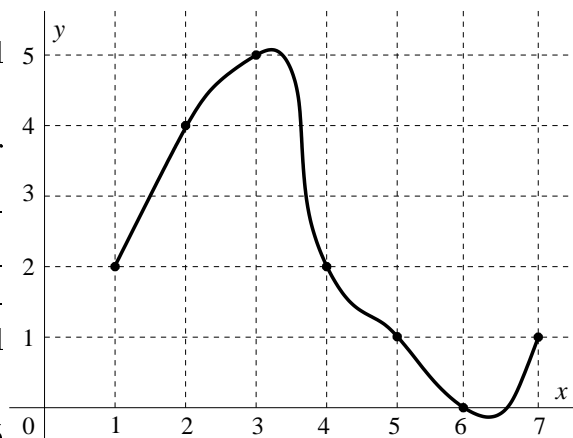
b) The region R is revolved around the y -axis. Compute the volume of the resulting solid.



- (9) 2. The graph of a function $f(x)$ on the interval $[1, 7]$ is shown below. [TO THE RIGHT]

a) Write the Simpson's Rule approximation for $\int_1^7 f(x) dx$ with $n = 6$ subintervals. No arithmetic needs to be done, *but* all function evaluations should be performed (therefore an expression like $f(3)$ should not appear in the final answer).

b) Suppose that for all x in $[1, 7]$, $|f''(x)| \leq 25$ and $|f^{(4)}(x)| \leq 50$. Find a bound for the possible error of the approximation written in part a). Again, the final answer need not be "simplified" arithmetically.



Graph of $y = f(x)$

- (13) 3. Verify that $\int_0^1 \frac{5x^2 - 3x + 4}{(x+1)(x^2+1)} dx = \frac{11}{2} \ln(2) - \frac{1}{2}\pi$.

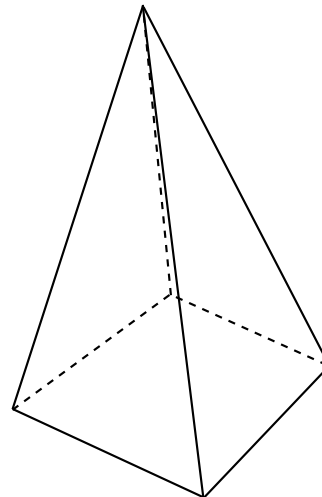
- (12) 4. Compute $\int_{e^2}^{e^3} (\ln x)^2 dx$.

- (13) 5. Compute $\int_1^3 \frac{1}{3+e^x} dx$. Show in some way that the value of this integral is less than $\frac{2}{3}$.

(13) 6. Compute the average value of $(\sec(x))^3 \tan(x)$ on the interval $[0, \frac{\pi}{3}]$. Is the answer larger than 2?

(12) 7. Compute $\int \frac{x^2}{\sqrt{1-x^2}} dx$.

(12) 8. A pyramid, shown to the right, has a square base which has side length 100 feet. The height of the pyramid is 200 feet. The density of the construction material is 300 lbs per cubic foot. How much work must be done to raise the material from ground level (the base of the pyramid) and build the pyramid?



A**A****First Exam for Math 152****Sections 1, 2, 3, 6, 7, 8, and 9**

FEBRUARY 23, 2009

NAME _____

SECTION _____

Do all problems, in any order.**Show your work. An answer alone may not receive full credit.****No texts, notes, or calculators other than the
formula sheet may be used on this exam.**

Problem Number	Possible Points	Points Earned:
1	16	
2	9	
3	13	
4	12	
5	13	
6	13	
7	12	
8	12	
Total Points Earned:		

Find exact values of standard functions such as e^0 and $\sin\left(\frac{\pi}{2}\right)$.**Otherwise do NOT “simplify” your numerical answers!****A****A**