SCORE_____

1. Find the volume of the solid formed by revolving the region bounded by the graphs of $y = \frac{1}{4}x^2$ and $y = 5 - x^2$ about the x-axis.

[15 points]

2. Using the shell method, find the volume of the solid formed by revolving the region bounded by the graphs of $y = x^2 + 1$, $y = 0$, $x = 0$, and $x = 1$ about the y-axis.

[15 points]

3. If the work required to stretch a spring 1 ft beyond its natural length is 12 ft-lb, how much work is needed to stretch it 9 in. beyond its natural length?

[10 points]

4. Evaluate the following integrals.

(a) $\int x \sin 3x \, dx$

[15 points]

(b) $\displaystyle\int \frac{\sqrt{x^2-9}}{x}\,dx$

[15 points]

5. Evaluate $\displaystyle\int \sec x \tan^3 x \, dx$.

[15 points]

6. Sketch the region bounded by the curves $f(x) = 2x^2$ and $g(x) = 4 + x^2$ and find its area.

[15 points]

Bonus. Evaluate $\displaystyle\int \frac{x}{\sqrt{x^2 + 4x + 8}}\, dx$.

[7 points]