Name _____ Instructor _____

Analytic Geometry and Calculus II
Math 221 - Test 2B
July 18, 1997

You must show all relevant work to receive full credit. The point value of each problem is shown in the left hand margin.

(10) 1. Integrate

$$\int \frac{x^4 + 5x^2 + 1}{x^3 + x}\, dx$$

(10) 2. Integrate

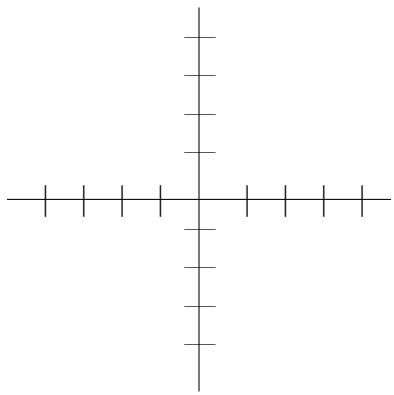
$$\int x^3\sqrt{9-x^2}\ dx$$

(20) 3. Integrate

a. $\int_{-1}^{32} \frac{1}{\sqrt[5]{x}}\, dx$

b. $\int_{1}^{\infty} \frac{1}{x^5}\, dx$

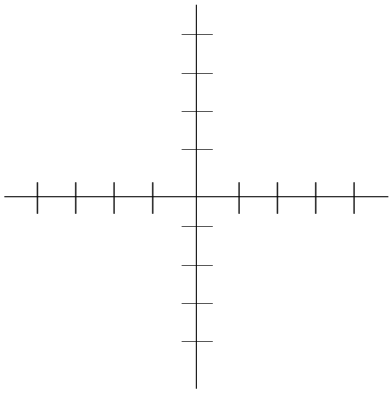
(10) 4. Sketch the graph of the polar equation $r = 1 - 2\sin\theta$.



(10) 5. Find the area of the region that is inside the circle $r = 1$ and outside $r = 2 - 2\sin\theta$.

(10) 6. Write the equation of the indicated conic section in standard form. Identify the vertex, focus, and directrix. Sketch the graph of the equation, showing these features on your graph.

$$x^2 - 4x - 4y + 4 = 0$$



_____ Standard Form

_____ Vertex

_____ Focus

_____ Directrix

(10) 7. Sketch the graph of $\dfrac{(y-3)^2}{4} - \dfrac{x^2}{9} = 1$, showing the center, asymptotes and vertices. (Label the center and the vertices.)

(10) 8. Determine whether or not the sequence $\{a_n\}$ converges, and find its limit if it does.

$$a_n = \frac{n^\pi + 1}{\pi^n}$$

(10) 9. Find the limit of the recursive sequence

$$\sqrt{42 + \sqrt{42 + \sqrt{42 + \dots}}}$$