

MATH 2730.003 Homework Set 1
due Thu, 9/2/10

Section 4.4: 20, 24, 34, 36

Graph the following equation. Include the coordinates of any local extreme points and inflection points.

20. $y = x^4 + 2x^3 = x^3(x + 2)$

24. $y = x - \sin x, 0 \leq x \leq 2\pi$

34. $y = (2 - x^2)^{3/2}$

36. $y = \frac{x^3}{3x^2 + 1}$

Chapter 8 Practice Problems: 24, 44, 84, 94

Evaluate the following integrals. To transform each integral into a recognizable basic form, it may be necessary to use one or more of the techniques of the algebraic substitution, completing the square, separating fractions, long division, or trigonometric substitution.

24. $\int \frac{dv}{v(2 + \ln v)}$

44. $\int \sin^3 \theta \cos^2 \theta d\theta$

84. $\int x^2 \ln x dx$ (integration by parts)

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

Section 10.5: 16, 20, 32, 36, 54

16. Graph the sets of points whose polar coordinates satisfy $\theta = \pi/2, r \leq 0$.
20. Graph the sets of points whose polar coordinates satisfy $-\pi/4 \leq \theta \leq \pi/4, -1 \leq r \leq 1$.
32. Replace the polar equation $r^2 = 4r \sin \theta$ by an equivalent Cartesian equation. Then describe or identify the graph.
36. Replace the polar equation $r = 4 \tan \theta \sec \theta$ by an equivalent Cartesian equation. Then describe or identify the graph.
54. Replace the Cartesian equation $x^2 - y^2 = 1$ by an equivalent polar equation.

Section 10.7: 2, 8

2. Find the area of the region inside the cardioid $r = a(1 + \cos \theta)$, where $a > 0$ is a constant.
8. Find the area of the region shared by the circles $r = 1$ and $r = 2 \sin \theta$.