MAT 162 Final Exam Name

Spring 2014 version 2

For full credit, show all work.

1. Calculate the following”
   1. 

* 1. 

1. Tell whether  converges or diverges, and why.

1. Use the trapezoidal rule with n = 6 to estimate .

1. Find the length of the graph of the curve , 0 ≤ x ≤ 3, if dy/dx = (5+3x)**.5** .

1. Find the centroid of the region bounded by the curves y = x - 10 , y = x2 - 12 .

1. Find k so that f(x) =  if x≥4 and f(x) = 0 if x <4, is a probability density function.

VII. Solve completely:

(a)  =  , y(0) = 2.

(b)  - 7y = 5e4x

(c)  + 12 -45y = 0.

1. Use Euler’s Method and a stepsize of h = 0.1 to estimate y(.2) where = x4+(1+y), y(0) = 3.

IX. A 1000 liter tank is initially filled with brine that contains dissolved salt. A salt solution of .004 kg/l enters the tank at a rate of 50 l/minute; the tank is continuously mixed and a solution drains from the tank at a rate of 60 l/minute. In 50 minutes there is exactly 2 kg of salt in the tank. How much salt was in the tank in the beginning?

1. Find the foci and vertices and sketch the graph of -y2 + x+ 16x = 24.
2. Convert r = 9cos(θ) into rectangular coordinates and sketch the graph. Find the slope of the tangent line at θ = .
3. For x =t2 and y = t3 - 3t, -2< t < 2
4. Find the points where the parametric system has a vertical tangent line.
5. Find the points where there are horizontal tangent lines.
6. Find where x is increasing.
7. Find where y is increasing.

(e) Sketch the graph of the system on an x-y coordinate system.

1. Tell why each series is conditionally convergent, absolutely convergent or divergent.

(a) 

(b) 

(c) 

1. Find the radius and interval of convergence for f(x) = .

XV. Use a power series to estimate  with an error less than 10-25.