MAT 162 Final Exam Name

Summer II 2016 Version 1

For full credit, show all work.

1. Calculate the following”
   1. 

* 1. 

1. Tell whether  converges or diverges, and why.

1. Use the Simpson’s rule with n = 6 to estimate .

1. Find the length of the graph of the curve , 0 ≤ x ≤ 5 .

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1. Find the centroid of the region bounded in the first quadrant by the curves y = x and 32 = x4 + y4 . Set up the integrals; you do not have to solve them. (Hint use the region where y = x is the bottom boundary curve.)

1. Find k so that f(x) =  if x≥20 and f(x) = 0 if x <20, is a probability density function.

VII. Solve completely:

(a)  =  , y(0) = 1.

(b)  + 2y = 5x

(c)  + 5 -36y = 0.

1. Use Euler’s Method and a stepsize of h = 0.1 to estimate y(.2) where = y(5x+y)2, y(0) = 2.

IX. A 1000 liter tank is initially half filled with brine that contains dissolved salt. A salt solution of .003 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 40 l/minute. At the start there is exactly 1 kg of salt in the tank. How much salt will be in the tank 30 minutes from the beginning?

1. Find the foci and vertices and sketch the graph of x2 - 16x + 25y+ 150y + 189= 0 .
2. Convert r = 3/(1+ cos(θ)) into rectangular coordinates and sketch the graph. Find the slope of the tangent line at θ = .
3. For x = t2 + 1 and y =t3 – 4t, - 3< t < 3
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.