Fall, 2018 Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

MAT 162001 Test 2 Version 1 Gurganus

Directions: Show all work for partial credit purposes. You may use a graphing calculator. Otherwise the test is closed book. Each problem except 2 is worth 14 points. Problem 2 is 16 points.

1. Find the length of the curve y = (2x+7)1.5 , 3 ≤ x ≤5 .

1. Find the centroid (center of mass) of the region bounded by the curves: *y* = x – 10 and

 *y* = 14 – x , and x = 10.

1. Find y(x), the solution to y2 $\frac{dy}{dx}$ = ( x 2+ 1) , y(0) = 1.
2. Let f(x) = (x-6 + Ax-8 ) for x ≥ 1 ( for x < 1, f(x) = 0 ).
3. Find the value of A in order that f(x) is a probability density function.
4. Find the mean of the probability density function.
5. Find y(x), the solution to $\frac{dy}{dx}$ + $\frac{\cos(\left(x\right))y}{sin⁡(x)}$ = 1 , y(π/2) = 2 .
6. Find the solution to $\frac{d^{2 }y}{dx^{2}}$ +15$\frac{dy}{dx}$ -16y = 0 , y(0) = 1, y'(0) = 4.
7. A biological population is growing at a rate directly proportional to the size of the population. At t = 0 hours, the population is 3 units and at t= 4 hours the population is 5 units. Find the population at t = 7 hours.