

MAC 2312 EXAM IV TOPICS (80 pts.) (9th Ed.)

- 9.1 ① Determine the limit of a sequence or writing a sequence in bracket notation. (5)
- 9.3 ② Determine if a geometric series converges, and if so find its sum. (5)
- 9.3 ③ Find the n^{th} partial sum of a telescoping series (in closed form), and determine the sum of the series from it. (10)
- 9.3-9.6 ④ Using different tests (not always specified) to determine convergence or divergence of series (divergence test, geometric series, p-series, ratio^{root}, comparison, alternating series, integral) (45)
- 9.6 ⑤ Estimating the sum of an alternating series to within a prescribed degree of accuracy. (5)
- 9.6 ⑥ Classifying series as absolutely convergent, conditionally convergent, or divergent. (5)
- ⑦ Proof that the harmonic series diverges using $S_{(2^n)}$, or that $\lim_{n \rightarrow \infty} \sqrt[n]{n} = 1$. (5)

(10) Find the area of the region bounded by the curve $y^2 = 2x - 2$ and the line $y = x - 5$ using y integrals.

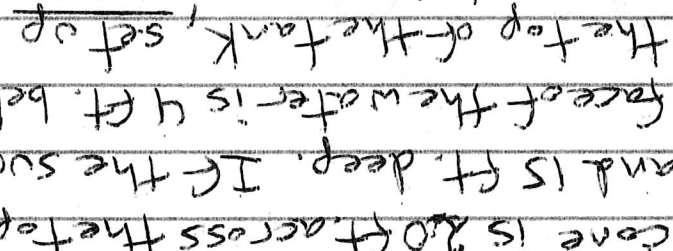
(10) (2) The region bounded by $y = x^2 + 1$ and $y = x + 3$ is revolved around the x -axis. Set up the volume of the solid generated. Use disks or washers.

(10) (3) The region enclosed by $x = 2y - y^2$ and $x = 0$ is revolved about the x -axis. Use shell method to find the volume of the solid generated.

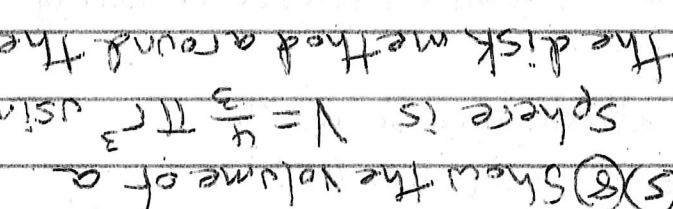
(10) (4) Find the length of the curve $x = at$, $y = \frac{3}{2}t^{3/2}$ from $t = 5$ to $t = 12$. Find the length of $x = \frac{y^3}{3} + \frac{2y}{3}$ from $y = 1$ to $y = 2$. (10) (6) A force of 8 newtons stretches a spring of natural length 4 meters to 4.5 meters. Find the work done in stretching the spring from its natural

(10) (7) A water tank in the form of an inverted right-circular cone is 20 ft across the top and 15 ft deep. If the surface of the water is 4 ft below the top of the tank, set up an integral for the work done in pumping all the water out over the top rim.

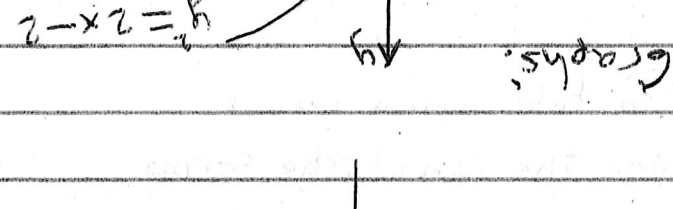
(10) (8) Show the volume of a sphere is $V = \frac{4}{3}\pi r^3$ using the disk method around the x -axis. Hint:



(10) (5) Find the volume of a sphere is $V = \frac{4}{3}\pi r^3$ using the disk method around the x -axis.



(10) (9) Find the length of the curve $x = at$, $y = \frac{3}{2}t^{3/2}$ from $t = 5$ to $t = 12$. Find the length of $x = \frac{y^3}{3} + \frac{2y}{3}$ from $y = 1$ to $y = 2$.



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