

MAT 126 Practice Final

Name: _____

<i>Problem</i>	1	2	3	4	5	Total:
<i>Points</i>	50	10	20	10	10	100
<i>Scores</i>						

No calculators or books will be allowed on this test. When calculate indefinite integrals, the answers should be in explicit forms, i.e. not using part1 of Fundamental Theorem of Calculus, unless otherwise stated.

1. Evaluate each of the following limits, definite/indefinite or improper integrals.

(a) $\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{i=1}^n \cos \frac{3i}{n}$

(b) $\int \arctan(x + 2) dx$

(c) $\int \frac{x - 5}{3x^2 - 2x - 1} dx$

(d) $\int \frac{x}{\sqrt{1-x^2}} dx$

$$(e) \int_5^6 \frac{x^2}{(x-6)^3} dx$$

2. Find the area enclosed by parabolas $x = y^2 - y$ and $x = 3y - y^2$.

3. Find the following volumes, please indicate which method (washer/cylindrical shell) you are using.

- (a) The solid obtained by rotating about x-axis the region enclosed by $x = 0$, $x = 1$, $y = e^{2x}$ and $y = (e^2 - 1)x + 1$.

- (b) The solid obtained by rotating about y -axis the region enclosed by $x = 2$, $x = 3$, $y = e^x + x + 2$ and $y = 0$.

4. $y(x) = \int_1^x \sqrt{t^2 + 2t} dt$. Find the exact length of the graph of y on the interval $[1, 4]$ (namely $1 \leq x \leq 4$).

5. Find number c inside the interval $[-1, 3]$ such that $f(c)$ is equal to the average value of $f(x) = x^2 - 2x - 8$ on that interval.