Instructions:

- Do not open the exam until you are instructed to do so.

- Write your name and student ID number on the front page of the exam.

- Write your name and student ID number at the top of every page of the exam.

- Answer the questions in the spaces provided. If you run out of room for an answer, continue on the back of the page.

- If you need more paper, ask one of the proctors and we will provide it.

- There are extra pages at the end of the exam for scratch work.

Math 20B – Midterm 1 – 10/24/2018

Name & Student ID: _____

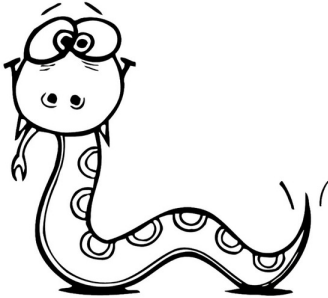| Question:	1	2	3	4	Total
Points:	10	10	10	10	40
Score:					

1. Sam the snake slithers sneakily south at a speed of

$$s(t) = 1 + \frac{1}{1+t}\sin\left(\ln(1+t)\right)$$

meters per second, where t is the number of seconds which have passed since sunset.

(a) (3 points) Set up an integral (but do not evaluate it) which calculates Sam's displacement over the first T seconds after the sun sets.

(b) (7 points) Calculate Sam's displacement over the first 10 seconds after the sun sets.

2. (a) (5 points) Find the antiderivative:

$$\int \tan(x)dx.$$
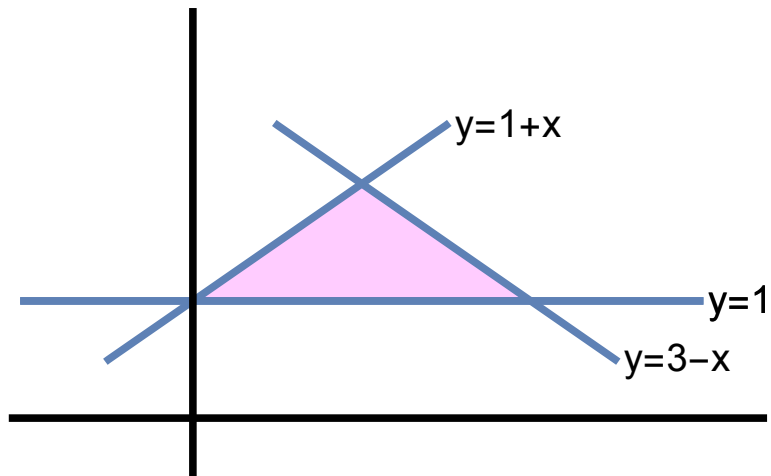
Show your work!

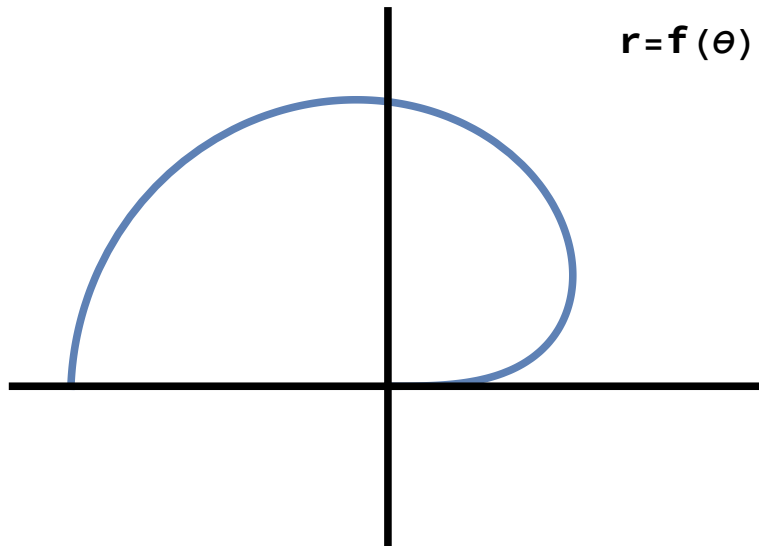(b) (5 points) Compute the definite integral:

$$\int_0^3 xe^x dx.$$

3. (10 points) Find the volume of the solid of revolution given by rotating the region bounded by $y = 1 + x$, $y = 3 - x$, and $y = 1$ around the x-axis.

y=1+x

y=1

y=3−x

4. (10 points) Find the area between the polar curve $r = f(\theta)$ and the origin, for $0 \leq \theta \leq \pi$. Here

$$f(\theta) = \sqrt{\frac{\theta}{1 + \theta}}.$$

r=f(θ)

Scratch Paper.

Scratch Paper.