

Math 124 Section G Online, Fall 2019 Midterm 2

November 19, 2019

Name \_\_\_\_\_

Student Number \_\_\_\_\_

Seat Number \_\_\_\_\_

**Instructions.**

- These exams will be scanned. **Please write your name clearly for easy recognition.**
- There are 4 questions. The exam is out of 40 points.
- You are allowed to use one page of notes written only on one side of the sheet in your own handwriting.
- You can only use a Ti-30x IIS calculator. Unless otherwise stated, you have to give exact answers to questions. ( $\frac{2\ln 3}{\pi}$  and  $1/3$  are exact, 0.699 and 0.333 are approximations for the those numbers.)
- **Show your work.** If I cannot read or follow your work, I cannot grade it. **You may not get full credit for a right answer if your answer is not justified by your work.** If you continue a question on the last page, make a note for me.

Question	points
1	
2	
3	
4	
Total	

1. Find  $\frac{dy}{dx} = y'$  for the following functions.

(a)  $y = \frac{1}{x^2 + \sqrt{\tan x + 4^x}}$

(b)  $xe^y - 5xy + xy^2 = \cos y$

(c)  $y = (x^2 + 1)^{5x}$

2. Use linear approximation to estimate the value of  $\sqrt[5]{33}$ . Is your approximation more or less than the actual value. Explain. (This question must be done without the use of a calculator.)

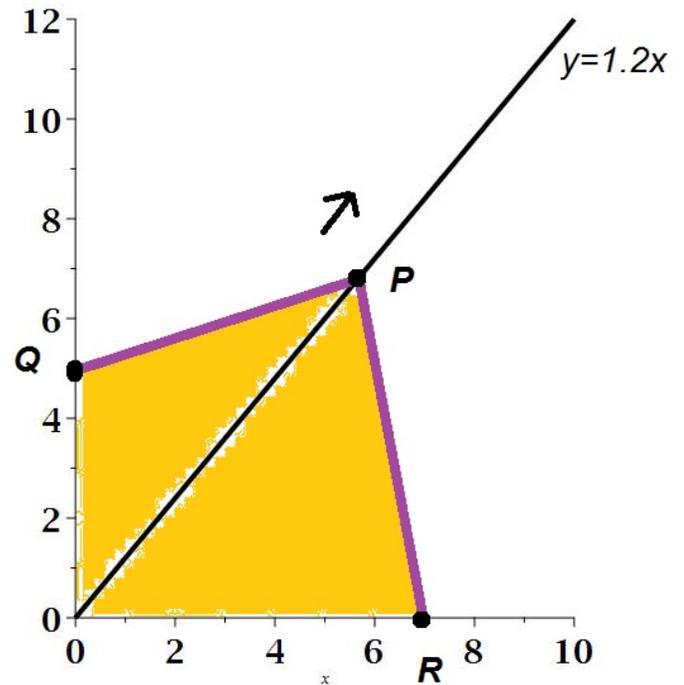
3. Compute the values of  $\frac{dy}{dx}$  and  $\frac{d^2y}{dx^2}$  at the point where  $t = 2$  for the parametric equations

$$x = 5e^{t-2} + 5t^3$$

$$y = \ln(t - 1) + t.$$

4. An elastic band is attached to the points  $Q(0,5)$ ,  $R(7,0)$ , and  $P$ . The point  $P$  moves on the line  $y = 1.2x$  getting away from the origin at a speed of 1.7 units per second.

- (a) How fast is the  $x$ -coordinate of the point  $P$  changing?



- (b) How fast is the shaded area increasing when the point  $P$  is 15 centimeters from the origin?