

# MATH 1271 SECTION 30 RECITATION QUIZ 9

Grader: Cihan Bahran

Name: SOLUTIONS

Time limit: 20 minutes

TA: \_\_\_\_\_

NO CALCULATORS. NO HANDHELD DEVICES. NO BOOKS OR REFERENCE MATERIALS OF ANY KIND.

1. (35 points) Evaluate the limit

$$\lim_{n \rightarrow \infty} \left( \frac{1}{n} \sum_{j=1}^n \frac{1}{1 + \frac{j^2}{n^2}} \right)$$

by first converting it to a definite integral.

$$\int_0^1 \frac{dx}{1+x^2}$$

$$\left[ \arctan x \right]_{x \rightarrow 0}^{x \rightarrow 1}$$

$$\frac{\pi}{4} - 0$$

$$\frac{\pi}{4}$$

2. (10 points) Is the following statement true or false?

Both  $\frac{\sec^2 x}{2}$  and  $\frac{\tan^2 x}{2}$  are anti-derivatives of the function  $(\sec^2 x)(\tan x)$ .

$$\frac{\cancel{2}(\tan x)(\sec^2 x)}{\cancel{2}}$$

$$\frac{\cancel{2}(\sec x)(\sec x)(\tan x)}{\cancel{2}}$$

True

False

3. (20 points) Consider the function

$$f(x) = \int_0^x (t^2 - 5t + 6) dt.$$

Which of the following tables describes the maximal intervals of increase and decrease for  $f$ ?

A) 

$x \leq 2$	$2 \leq x \leq 3$	$x \geq 3$
inc.	dec.	inc.

B) 

$x \leq 2.5$	$x \geq 2.5$
inc.	dec.

C) 

$x \leq 2$	$2 \leq x \leq 3$	$x \geq 3$
dec.	inc.	dec.

D) 

$x \leq 2.5$	$x \geq 2.5$
dec.	inc.

$$f'(x) \stackrel{\text{FTC}}{=} x^2 - 5x + 6$$

$$= (x-2)(x-3)$$

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$f'$

pos	0	neg	0	pos										
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2	3													

4. (35 points) Compute the indefinite integral

$$\int \left( e^{6x} + \cos(x/5) + \frac{x^4 + 2x^3 + 8}{\sqrt{x}} \right) dx$$

||

$$\int e^{6x} + \cos\left(\frac{1}{5}x\right) + x^{7/2} + 2x^{5/2} + 8x^{-1/2} dx$$

||

$$\frac{e^{6x}}{6} + \frac{\sin\left(\frac{1}{5}x\right)}{1/5} + \frac{x^{9/2}}{9/2} + 2\left(\frac{x^{7/2}}{7/2}\right) + 8\left(\frac{x^{1/2}}{1/2}\right) + C$$