

Math 10A with Professor Stankova

Quiz 9; Wednesday, 10/25/2017

Section #106; Time: 10 AM

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Circle True or False or leave blank. (1 point for correct answer,  $-1$  for incorrect answer, 0 if left blank)

1. True    False    The general form of the solution to  $\frac{dy}{dx} = y$  is  $y = e^x + C$ .
2. True    False    In order to show that the integral  $0 \leq \int_1^\infty \frac{1}{f(x)} dx$  converges, it suffices to find a function  $g(x)$  such that  $f(x) \geq g(x)$  on  $[1, \infty)$  and show that  $\int_1^\infty \frac{1}{g(x)} dx$  converges.

Show your work and justify your answers. Please circle or box your final answer.

3. (10 points) (a) (4 points) Suppose that  $\frac{dy}{dx} = \sin(x) \csc(y)$ . Find a solution such that  $y(0) = \pi$

(b) (3 points) Integrate  $\int_0^\infty \frac{2x}{(1+x^2)^2} dx$ .

- (c) (3 points) Does the integral  $\int_0^\infty \frac{2x \sin^2(x)}{(1+x^2)^2 + e^{-x}} dx$  converge? Hint: Use the previous part.