

Name: _____

Math 1152Q: Fall 2018

Week 7 Quiz Bonus points (will be added to your original quiz score, up to 100%)

1. (a) Evaluate the indefinite integral $\int \frac{x}{3^x} dx$.

Then confirm that your answer is correct either by differentiating your answer or by checking with software such as WolframAlpha.

- (b) Let t be a number larger than 2. Using (a), evaluate the definite integral

$$\int_2^t \frac{x}{3^x} dx$$

- (c) Let N be a positive number, and let t be a number larger than N . Evaluate the definite integral

$$\int_N^t \frac{x}{3^x} dx$$

Hint: Your answer should look like your answer to part (b) except that you replace 2 with N .

- (d) Let N be a positive number. Using your answer for parts (c), compute the improper (convergent) integrals

$$\int_2^\infty \frac{x}{3^x} \quad \text{and} \quad \int_3^\infty \frac{x}{3^x} \quad \text{and} \quad \int_N^\infty \frac{x}{3^x} dx$$

- (e) Using a calculator and your answers from part (d), write down the approximations of

$$\int_2^\infty \frac{x}{3^x} \quad \text{and} \quad \int_3^\infty \frac{x}{3^x}$$

accurate to 2 decimal points. Compare these two values with 0.2.